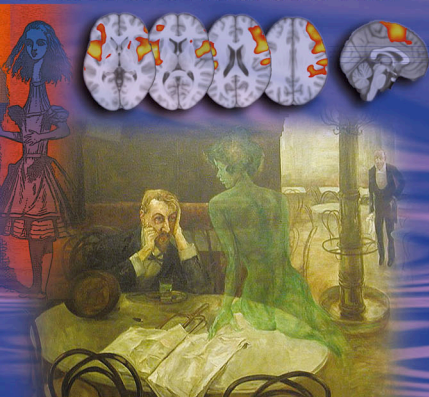


Jan Dirk Blom

# A Dictionary of Hallucinations



 Springer

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*Cover illustration:* 1. 'The Absinthe Drinker'. Oil painting (c. 1903) by Viktor Oliva; 2. 'Alice in Wonderland'. Illustration (c. 1865) by John Tenniel 3. Functional MRI scans of the brain, axial slices, group analysis. The yellow, orange, and red areas represent an increase in the BOLD response concomitant to verbal auditory hallucinatory activity. Scan images courtesy of Dr. Rutger Goekoop and Dr. Jasper Looijestijn, Parnassia Bavo Group, The Hague.

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# Preface

Our history is full of the reports of visionaries, prophets, and other figures who derived their insights and authority from what we would now call hallucinations. As these reports testify, individuals who knew how to deploy them convincingly for some noble cause were often rewarded with a high social status. Religious texts like the Bible even indicate that for a long time no event of importance was thought to take place without some announcement by a voice or vision from beyond. Thus one might hold that hallucinations have constituted a legitimate source of information and inspiration in most – if not all – ancient cultures. On the other hand, for other groups of individuals they have always constituted a significant source of suffering. But even in these cases, the concept of illness seldom seemed to come to mind. Those who needed help were more likely to be taken to a priest than to a physician. According to Zilboorg and Henry, for thousands of years it was unthinkable that doctors, with their earthly methods, would involve themselves in matters pertaining to the spirit. This may well have been the principal reason why biomedicine became involved in the study of hallucinations so late in its developmental history.

From the 17th century on, the rise of scientific thinking and the simultaneous process of secularization brought about a shift in the general attitude towards hallucinations. Their otherworldly origin was no longer taken for granted, and the writings in which they appeared were increasingly interpreted as allegorical in nature. The work published in 1813 by John Ferriar is often referred to as the first text that examines hallucinations from an exclusively physiological point of view. But when the 19th century came to a close, biomedicine was still hesitant about appropriating the territory to which it had become entitled. Although hallucinations had long since become their professional concern, doctors remained reluctant to give them the full attention that they deserved and to investigate them in their own right. Ironically perhaps, the first to take up the gauntlet were the parapsychologists. Represented by the philosopher Henry Sidgwick and his Society for Psychical Research (SPR), it was they who carried out the first large-scale scientific studies of hallucinations.

On the scale of human history, biomedicine was late to the game of hallucinations research. But once the game was on, it quickly gained momentum. In 1932 Raoul Mourgue published an overview of 7,000 biomedical studies on hallucinations, and even he admitted that it was not exhaustive. Today the number of studies on these phenomena is literally countless. This dictionary attempts to open up the literature on hallucinations and related phenomena (i.e., illusions and sensory distortions) by providing an alphabetical listing of the key terms and concepts, as derived from the historical and contemporary literature. As my reading abilities are limited to four languages, the references are mainly confined to English, German, French, and Dutch texts.

This dictionary does not claim to be exhaustive – how could it be? – but it does claim to provide a representative overview of relevant phenomena. The entries can be roughly divided into five categories:

1. Specific symptoms (i.e., hallucinations, illusions, and sensory distortions)
2. Medical conditions and substances associated with the mediation of hallucinations
3. Definitions of the terms hallucination and illusion by some important historical authors
4. Historical figures who are known to have experienced hallucinations
5. Miscellaneous issues

Each of the definitions of specific symptoms (under 1 above) includes the following:

- A definition of the term
- Its etymological origin
- The year of introduction (if known)
- A reference to the author or authors who introduced the term (if known)
- A description of the current use
- A brief explanation of the etiology and pathophysiology of the symptom at hand (if known)
- References to related terms
- Relevant literature references

During the era of classic psychiatry, the localizing value of different types of misperception was considered highly significant. As a consequence, much energy was devoted to their phenomenology, classification, and hypothetical relation with neurobiological processes. However, apart from post mortem histological research, the means to empirically validate the ensuing neurobiological models were limited. Today structural and functional imaging techniques allow us to localize the various CNS areas involved in the mediation of these phenomena and to answer the question of whether the complexity at the phenomenological level is indeed indicative of the assumed complexity at the underlying neurobiological and neuropsychological levels. But as the literature indicates, the present-day emphasis on empirical research is sometimes at the expense of the conceptual issues our predecessors valued so highly. Therefore, this dictionary aims to reappraise the concepts of hallucinations, illusions, and sensory distortions developed during the era of classic psychiatry and advocates to incorporate them into our current scientific *discours*.

Leiden, The Netherlands

Jan Dirk Blom

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# A

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## Abdominal Aura

Also known as visceral aura and epigastric aura. The term abdominal aura is indebted to the Latin words *abdomen* (belly) and *aura* (wind, smell). It is used to denote a type of \*somatosensory or \*somaesthetic aura that typically manifests itself as a rising epigastric sensation. Other presentations of the abdominal aura include viscerosensitive sensations such as abdominal discomfort, visceromotor symptoms presenting in the form of tachycardia, borborygmi or vomiting, and vegetative symptoms such as blushing and sweating. Pathophysiologically, the abdominal aura is associated with aberrant neuronal discharges in sensory cortical areas representing the abdominal viscera. Etiologically, it is associated primarily with paroxysmal neurological disorders such as migraine and epilepsy. The abdominal aura can be classified as a \*somatic or \*coenesthetic hallucination. The term is used in opposition to various terms denoting other types of somatosensory aura, notably \*splitting of the body image and \*paraesthesia.

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## Absinthism and Hallucinations

The term absinthism is indebted to the French noun *absinthe*, which in turn derives from the Greek noun *apsinthion* (wormwood). It has various connotations, referring either to the habitual ingestion of absinth or to a group of symptoms associated with absinth intoxication and/or withdrawal. This group of symptoms includes hallucinations and other \*psychotic phenomena, \*amaurosis fugax, insomnia, vertigo, tremors, transient paralysis of the limbs, \*delirium, and epileptic seizures. Absinth is an emerald-green liqueur flavoured with extracts of green anise, fennel, and grande wormwood (sometimes referred to as the ‘holy trinity’), as well as a mix of other herbs. It was created around 1792 as an all-purpose patent remedy by the French physician Pierre Ordinaire (1741–1821). The drink, which was marketed by the Swiss distiller Henri-Louis Pernod (1776–1851), became extremely popular in 19th-century Europe and, to a lesser extent, in the United States. Among those who contributed to the almost mythical proportions of absinth’s reputation were Charles



**Fig. 1** The Absinthe Drinker. Oil painting (around 1903) by Viktor Oliva. Source: Café Slavia, Prague

Baudelaire (1821–1867), Edouard Manet (1832–1883), Edgar Degas (1834–1917), Vincent van Gogh (1853–1890), Oscar Wilde (1854–1900), and Henri de Toulouse-Lautrec (1864–1901). The mechanism of action of absinth in the mediation of hallucinations is unknown. The person credited with conducting the first experimental biomedical research on the drink's hallucinatory effects is the French alienist Jacques Joseph-Valentin Magnan (1835–1916). Magnan exposed various mammals to the vapours of either wormwood oil (the essence of absinth) or alcohol (the base of absinth). As he reported in 1874, the animals that inhaled the alcohol vapours got drunk, while those that inhaled the vapours of wormwood had a heightened risk of epileptic seizures. On the basis of observations such as Magnan's, it has been suggested that thujone (one of the active components of wormwood oil) acts as a convulsant and is thus responsible for mediating the notorious hallucinatory activity of

absinth intoxication. However, it has also been suggested that the absolute amounts of thujone in absinth are so small that its effects are overshadowed by those of ethanol, and that the latter ingredient should therefore be held responsible for the majority of symptoms associated with absinthism. In the latter reading, the hallucinations are attributed either to ordinary alcoholic hallucinosis or to the effects of alcohol withdrawal delirium. A third hypothesis suggests that the hallucinatory effects reported in the 19th century did differ from alcoholic hallucinosis and withdrawal delirium, but only because they were due to cheap imitations of absinth that contained copper sulphate and other toxins – instead of chlorophyll from plant extracts – to mimic the drink's characteristic emerald-green colour. Some of the other candidate substances for the purported hallucinogenic effects of those imitations are methanol, \*nutmeg, calamus, turmeric, and aniline green. The 19th-century European and

American authorities considered absinth such a severe threat to public health that around 1900 it was legally prohibited in many Western countries. For over a century, that ban remained largely in place. During the early 21st century many of those countries legalized the consumption of absinth, thus far without any notable effects upon public health.

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### Accommodation–Convergence Micropsia

see Convergence micropsia.

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### Accommodative Micropsia

see Convergence micropsia.

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### Acenesthesia

Also known as acoenesthesiopathy, general elementary somatopsychosis, and asomatognosia. The term acenesthesia comes from the Greek words *a* (not), *koinos* (communal), and *aisthanesthai* (to notice, to perceive). It translates loosely as ‘not being able to perceive the common sensation’. In this context the expression common sensation refers to the classic medical concept of coenesthesia, which refers to the ‘common sensation’ or ‘common general sensibility’ arising from the sum of all bodily sense impressions. (For a further explanation of the term coenesthesia, see the entry Coenesthetic hallucination.) The terms acenesthesia and acoenesthesiopathy are used to denote a rare condition characterized by a total lack of awareness of one’s own physical body, or a loss of the sensation of physical existence. The German neurologist and neurosurgeon Otfried Foerster (1873–1941) is commonly credited with providing the first case report of a person suffering from acenesthesia in a paper published in

1903. Foerster himself used the German expression *allgemeine elementare Somatopsychose* (i.e., ‘general elementary somatopsychosis’) to denote this condition. The individual described in this paper complained that she could no longer feel her head, her arms, her legs, or any of her other body parts, unless they were touched by someone or something. In his paper Foerster attributes this disorder of coenesthesia to a “lack of function of the somatopsyché” and points out that it would seem to have a chronic course. In 1905 the term acoenesthesiopathy was attached to this condition by the French neurologists Paul Camus and Gaston Deny. Camus and Deny envisage acoenesthesiopathy as a disorder of coenesthesia. As a generic term for this group of disorders they propose the term \*coenesthesiopathy. Unilateral feelings of ‘nothingness’ are referred to in the literature as \*hemiasomatognosia, imperception for one-half of the body, hemidepersonalization, negative phantoms, autosomatamnesia, and autosomatagnosia. It is as yet uncertain whether acenesthesia deserves to be classified as a distinct nosological entity or rather as a symptom occurring in the context of disorders such as \*dissociation and migraine. In the context of migraine, it is known as a complication of the – equally rare – bilateral spectrum. Today the term acenesthesia has been largely discarded in favour of asomatognosia, a term attributed to the French psychiatrist Jean Lhermitte (1877–1959). Moreover, modern descriptions of asomatognosia/acenesthesia tend to include cases in which the lack of awareness of bodily feelings is restricted to one or more body parts, such as an arm, a leg, both arms, or both legs. Pathophysiologically, acenesthesia is associated primarily with lesions affecting one or more parts of the parietal cortex involved in embodiment and corporeal awareness (more specifically, the premotor cortex). In the literature on asomatognosia right-sided parietal lesions would seem to dominate, affecting the contralesional side of the body. Acenesthesia should not be confused with \*total anaesthesia, which is characterized by a failure to detect tactile and other somatosensory stimuli, or with Cotard’s syndrome, a condition in which the affected individual may have the delusional conviction – as opposed to the perceptual experience – that his or her body has ceased to exist. However, it may be accompanied by Cotard’s syndrome or even by \*negative autoscopy (i.e. the failure to visually perceive one’s own body).



## References

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## Achromatism

see Achromatopsia.

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## Achromatopsia

Also referred to as monochromatism, monochromatopsia, and total colour blindness. The term achromatopsia comes from the Greek words *achrōmatos* (colourless) and *opsis* (seeing). It refers to the inability or strongly diminished ability to perceive colour. Traditionally two types of achromatopsia are distinguished, called typical achromatopsia (or rod monochromatism) and atypical achromatopsia (also referred to as incomplete achromatopsia or cone monochromatism). Typical achromatopsia is attributed to the congenital absence of normal cones in the retina, forcing the affected individual to depend on the rods for all visual sense perception. Individuals with typical achromatopsia are believed to see all things in shades of grey. They are therefore referred to as (typical) achromats or 'totally colour blind' persons. Typical achromatopsia is associated with photophobia, low visual acuity, and nystagmus. Atypical achromatopsia, on the other hand, is attributed to the presence of rods plus one type of cone (instead of the

three types present in individuals with normal trichromatism), entailing a rudimentary type of colour vision, typically in a single hue (i.e. red, green, or blue). Additional symptoms such as low visual acuity and nystagmus tend to be absent in cone monochromatism. Full-field achromatopsia, with or without visual agnosia, is rare. Its lifetime prevalence has been estimated at around 1 in 100,000. Etiologically, achromatopsia is associated with a variety of peripheral and central conditions. Although various accurate empirical studies of the centre for colour vision in the CNS have been available from the 1880s onwards, achromatopsia has long been associated either with peripheral conditions such as a lack of retinal cones, retinal trauma, and optic neuritis or with toxic disturbances such as lead poisoning and carbon disulphide poisoning. The notion of a central aetiology of achromatopsia was introduced by the Swiss ophthalmologist Louis Verrey (1854–1916). Today cerebral achromatopsia is conceptualized as a severe or absolute loss of colour perception due to a lesion affecting the lingual and fusiform gyri of the cerebral cortex. This variant of achromatopsia is believed to affect no more than 1 in 10 million people. As colour processing takes place in both hemispheres, full-blown cerebral achromatopsia always involves bilateral cerebral damage. When the lesions extend into the calcarine cortex or the optic radiations, the condition may be accompanied by superior \*quadrantanopsia. A variant of cerebral achromatopsia in which half the visual field is seen in shades of grey and the other half in colour is referred to as \*hemiachromatopsia. The term \*dyschromatopsia is used to refer to all instances of defective or residual colour perception. Both hemiachromatopsia and hemidyschromatopsia appear to be more prevalent than full-field achromatopsia. They are probably under-reported, however, as they frequently go unnoticed by both doctor and patient. The term pseudoachromatopsia is used to denote an individual's failure to perform well on colour vision tests, due to conditions other than achromatopsia proper (such as visuo-spatial neglect and amnesic colour blindness). Conceptually, achromatopsia constitutes a subclass of the group of \*colour vision deficiencies. The term is used in opposition to the terms \*normal trichromatism, \*anomalous trichromatism, \*dichromatism, and – from a different vantage point – also in opposition to the notion of a \*selective sparing of colour vision. While there would seem to be a certain phenomenological

overlap between achromatopsia and conditions such as \*scieropia and \*scierneuropia, it is as yet unclear whether these conditions are also related in a pathophysiological sense.

### References

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for the mediation of which peripheral and central mechanisms are held responsible. ACT is conceptualized as a condition that is mediated and sustained by central neural networks, even though it may originally have been triggered by a peripheral condition such as an ear lesion.

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### Acoasm

see Akoasm.

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### Acoenesthesiopathy

see Acenesthesia.

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### Acousma

see Akoasm.

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### Acoustic Hallucination

see Auditory hallucination.

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### Acoustic Phantasma

A term used in the older (i.e. pre-Esquirolian) literature to denote what is now commonly called an \*auditory hallucination.

### Reference

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### Acquired Centralized Tinnitus (ACT)

A term used to denote a type of \*tinnitus (i.e. ‘ringing in the ears’) that is not congenital and

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### Acquired Immunodeficiency Syndrome (Aids) and Hallucinations

The term acquired immunodeficiency syndrome, as well as the acronyms Aids and AIDS, refers to a collection of clinical symptoms and symptom complexes associated with specific damage to the immune system caused by the human immunodeficiency virus (HIV) in humans and by variants of HIV (such as simian immunodeficiency virus or SIV) in other mammals. Shortly after the initial infection, both HIV-1 and HIV-2 tend to affect the CNS. As a direct result of this CNS infection, meningitis or encephalitis may occur. During later stages of Aids, when the body’s immune function has significantly declined, the affected individual becomes prone to secondary pathology including fever, hypoxia, dehydration, electrolyte disturbances, uraemia, hepatic encephalopathy, cerebral toxoplasmosis, cryptococcal meningitis, progressive multifocal leucoencephalopathy, coccidioidomycosis, candidiasis, aspergillosis, histoplasmosis, cytomegalovirus infection, herpes simplex virus infection, varicella zoster virus infection, lymphoma, and Kaposi’s sarcoma. Each of these conditions constitutes a risk factor for the mediation of hallucinatory activity. An additional risk factor stems from the exposure of individuals with Aids to HAART (highly active antiretroviral therapy) and to adjuvant treatment with antibacterial, antifungal, antineoplastic, and antiviral therapeutics. Neuropathological studies indicate that HIV-related diseases of the CNS are located mainly in the subcortical structures of the brain (i.e. the white matter, the basal ganglia, and the hippocampus), as well as in the spinal cord. A type of subcortical dementia that occurs in over

50% of individuals suffering from late-stage Aids is referred to as Aids dementia complex (ADC). Psychiatric symptoms such as agitation, cognitive impairment, disorientation, sleep disturbances, mania, depression, delusions, and hallucinations may develop as a consequence of ADC, as well as the HIV-related disorders listed above. As in other types of dementia, the most prevalent type of hallucinations in ADC is the group of \*auditory hallucinations, followed by the group of \*visual hallucinations. Due to the considerable variety of structural and metabolic disturbances concomitant to Aids, the pathophysiological mechanisms that mediate those hallucinations are manifold. In clinical practice, they tend to be treated in the same way as hallucinations due to other diseases, i.e. primarily with the aid of antipsychotic medications.

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## Acquired Synaesthesia

see Non-idiopathic synaesthesia.

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## Acroparaesthesia

see Paraesthesia.

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## Active Illusion

A term introduced in or shortly before 1881 by the British psychologist James Sully (1842–1923) to denote a variant of what he calls illusions

of interpretation (now known as \*cognitive illusions). In Sully's reading, active illusions arise as a consequence of the false interpretation of a correctly perceived stimulus deriving from the extracorporeal environment, due to an improper excitement of the imagination. As Sully maintains, "A man experiences the illusion of seeing specters of familiar objects just after exciting his imagination over a ghost-story, because the mind is strongly predisposed to frame this kind of percept." Sully uses the term active illusion in opposition to the term \*passive illusion. He illustrates the latter type of cognitive illusion as follows: "For example, we fall into the illusion of hearing two voices when our shout is echoed back, just because the second auditory impression irresistibly calls up the image of a second shouter." As he concludes, "In the one case the mind is comparatively passive; in the other it is active, energetically reacting on the impression, and impatiently anticipating the result of the normal process of preperception. Hence I shall, for brevity's sake, commonly speak of them as Passive and Active Illusions."

### Reference

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## Acute Ascending Polyneuropathy and Hallucinations

see Guillain-Barré syndrome (GBS) and hallucinations.

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## Acute Brain Syndrome

see Delirium.

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## Acute Confabulatory Psychosis

see Hallucination of memory.

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## Acute Confusional State

see Delirium.

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### Acute Hallucinatory Insanity

see Paranoia hallucinatoria.

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### Acute Hallucinosi

The term acute hallucinosi refers to a subtype of \*hallucinosi characterized by a delusional and hallucinatory state of a limited duration not necessarily with an acute onset. The term was employed from about 1900 onwards in opposition to the expression \*chronic hallucinosi, which refers to a delusional and hallucinatory state of a more protracted, often permanent nature. As a nosological category, acute hallucinosi is classified as a specific type of the \*hallucinosi syndrome.

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### Acute Organic Reaction

see Delirium.

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### Acute Psychotic Syndrome After Penicillin

see Hoigné syndrome.

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### Additional Image Perception

see Pareidolia.

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### Aeropsia

The term aeropsia comes from the Greek words *aëros* (air) and *opsis* (seeing). It translates loosely as 'seeing the air'. The term was introduced in or shortly before 1983 by the American psychopharmacologist Henry David Abraham as

an alternative for the term \*visual snow. Its use would seem to be restricted to the literature on \*hallucinogen-induced persisting perception disorder (HPPD).

#### Reference

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### Aesthetic Illusion

Also written as esthetic illusion. Both terms are indebted to the Greek verb *aisthanesthai* (to notice, to perceive). They are used to denote the subjective experience that the content of a work of art is real. More specifically, they are used to denote the subjective experience that the daydream embodied by the work of art is the beholder's own, and that the protagonist featuring in it is an actual person who lives in an actual world.

#### References

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### Affective or Non-specific Verbal Hallucination

A term featuring in the 1974 Present State Examination (PSE) schedule, developed by the British psychiatrists John Kenneth Wing et al. As defined in the PSE, the expression affective or non-specific verbal hallucination refers to a variant of the group of \*verbal hallucinations characterized by a recognizable voice conveying one or two simple words (i.e. with non-specific content) or conveying a content that is congruent with a depressive or elated mood (i.e. with affective coloration). The term affective or non-specific verbal hallucination is used in opposition to the term \*non-affective verbal hallucination.

**Reference**

Wing, J.K., Cooper, J.E., Sartorius, N. (1974). *The measurement and classification of psychiatric symptoms. An instruction manual for the PSE and Catego Program*. Cambridge: Cambridge University Press.

relates, various complex hypotheses have been developed, many of which involve the adaptation of single cells or cell columns within the cerebral sensory cortex. Aftereffects are commonly classified as \*physiological illusions.

**Reference**

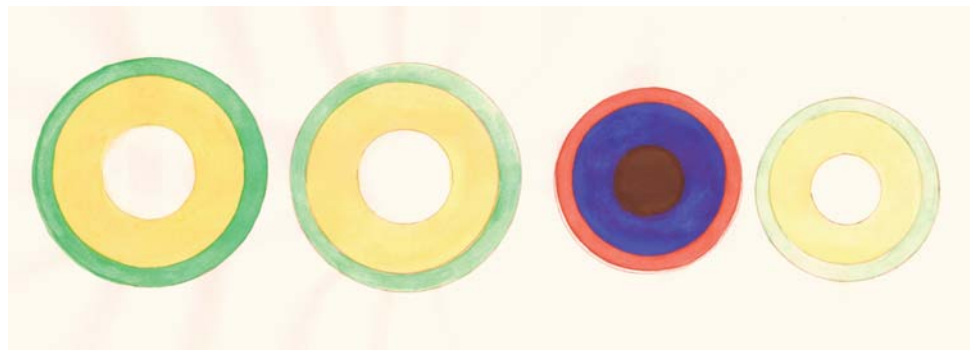
Mather, G., Verstraten, F., Anstis, S. (1998). *The motion aftereffect: A modern perspective*. Cambridge, MA: MIT Press.

**Aftereffect**

Also known as aftersensation and perceptual aftereffect. All three terms refer to the illusory visual perception that may follow prolonged exposure to a particular visual stimulus. As a rule, aftereffects present themselves in the inverted shape of the original percept. Thus in a subgroup of aftereffects, called the \*tilt aftereffect, staring at a pattern of lines tilted to the right is followed by the illusory impression that vertical lines are tilted to the left. Other examples of aftereffects include the \*contingent aftereffect (such as the \*McCollough effect, characterized by the complex, orientation-contingent illusion of complementary colours), the \*motion aftereffect (such as the \*waterfall illusion, in which stationary objects are perceived as if moving upwards after the prolonged viewing of descending masses of water), the \*postural aftereffect, the group of \*kinaesthetic aftereffects, the size aftereffect, the \*spiral aftereffect, and the \*rotational aftereffect. Most of the research on aftereffects involves visual illusory phenomena, but aftereffects can also occur in other (and perhaps all) sensory modalities. As to their neurophysiological cor-

**Afterimage**

Also referred to as aftersensation, afterimagery, and post-image. All three terms are used to denote a group of visual percepts that occur in response to a primary light stimulus to the eye, typically noticed after the stimulus has been shifted or removed. Afterimages tend to appear in a temporal sequence that can be subdivided into various stages. Under laboratory conditions, where brief primary stimuli of a relatively high intensity can be used, seven or more stages have been distinguished. The classical literature, however, which involves afterimages that occur under natural circumstances, confines itself to three stages. The first of these stages involves a very brief \*positive afterimage that is referred to as \*Hering's afterimage. These positive afterimages have the same relative brightness relations as the primary stimulus. The second stage involves a \*negative afterimage known as the \*Purkinje afterimage. These afterimages display



**Fig. 2** Afterimages. From left to right: original optical stimulus, Hering's afterimage, Purkinje's afterimage, Hess afterimage. Illustration by JDB

colours and brightness relations opposite to those of the primary stimulus. In addition, they tend to appear smaller than the objects or stimuli from which they derive, to last for seconds to minutes after the primary stimulus is removed, and to change slightly in size and shape before fading away. The third stage involves another positive afterimage, called the \*Hess afterimage. In his classic book chapter on afterimages, the American psychophysicist John Lott Brown provides the following additional nomenclature for various types of afterimages. The term \*homochromatic afterimage is used to denote an afterimage in which the distribution of hues is the same as that of the original stimulation field (as in positive afterimages). The term \*complementary afterimage is used to denote an afterimage in which the hues are approximately the complements of those in the original stimulating field (as in negative afterimages). And the term \*original afterimage is used to denote an afterimage seen in complete darkness after exposure of the eye to a primary stimulus. Negative afterimages have traditionally been classified as \*entoptic phenomena. They are believed to be mediated primarily by the bleaching of photochemical pigments, and/or neural adaptation of the retina, whereas the changes in the apparent size of these afterimages have traditionally been attributed to convergence and divergence movements of the eye. However, there is emerging evidence that both peripheral and central mechanisms may be responsible for the mediation of certain aspects of all types of afterimages. In hallucinogen-induced states such as LSD and mescaline intoxication, the hues of afterimages can be exceptionally strong, and the images themselves can last longer than usual. They may even appear more real and material than the \*visual hallucinations that occur during such states. The occurrence of positive afterimages (other than the afterimages identified by Hering and Hess) is rare, especially under physiological circumstances. They have been reported to occur in drug-induced states, as well as in drug-induced \*flashback phenomena and \*hallucinogen-induced persistent perception disorder (HPPD). Phenomenologically as well as conceptually, positive afterimages would seem to be more akin to central phenomena such as \*palinopsia, \*polyopia, and the \*trailing phenomenon than to negative afterimages. Afterimages are commonly classified as \*physiological illusions. Because of their lack of a tangible substratum in the extracor-

poreal world they are also classified as \*fiction illusions.

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### Afterimagery

see Afterimage.

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### Afterlife-Related Hallucination

Also known as hallucinatory near-death experience. The term afterlife-related hallucination was introduced in or shortly before 1977 by the parapsychologists Karlis Osis (1917–1997) and Erlendur Haraldsson (b. 1931) to denote a \*deathbed vision, usually \*visual or \*compound in nature, depicting what they refer to as “a kind of otherworldly messenger”. Often such ‘messengers’ are recognized by the dying person either as deceased loved ones or as religious or mythological figures. Because of their alleged role in summoning or escorting the individual from this world to the afterlife, such figures are also referred to as deathbed escorts, deathbed apparitions, or \*take-away apparitions. They may be described by the dying person as \*personifications, but also as \*apparitions manifesting themselves in the form of an unusual light or energy. According to Osis and Haraldsson, the predominant reaction of dying individuals to afterlife-related hallucinations is one of serenity and peace, religious emotion, and \*ecstatic feelings.

### References

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## Aftersensation

see Aftereffect.

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## Agaric and Hallucinations

see *Amanita reverie*.

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## Agathosma

The term agathosma comes from the Greek words *agathos* (good) and *osmè* (smell, stink, fragrant, odour, scent, perfume). It translates loosely as 'good smell'. The term agathosma is used to denote an illusory or hallucinatory olfactory percept that presents itself in the form of a pleasant odour such as the scent of flowers, perfume, or honey. The term agathosma is used in opposition to the term *\*cacosmia* ('bad smell').

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## AIDS and Hallucinations

see Acquired immunodeficiency syndrome (Aids) and hallucinations.

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## Akinetopsia

Also referred to as cerebral akinetopsia and visual motion blindness. The term akinetopsia comes from the Greek words *akinèsia* (absence of motion) and *opsis* (seeing). It was introduced in or shortly before 1991 by the British neurobiologist Semir Zeki to denote a selective deficit in the ability to perceive motion. Akinetopsia is an extremely rare condition attributed to bilateral cortical lesions in the vicinity of striate cortex. The first full description of visual motion blindness was formulated by the German neurologist Josef Zihl and colleagues, who in 1983 reported a case in which the individual affected was unable to see motion. As rendered by Zihl

et al., streaming fluids were described as frozen, and people who were moving about as popping up here and there. Akinetopsia is generally classified as a *\*sensory distortion*. Pathophysiologically, it is associated with bilateral damage to the occipito-temporal area V5, the so-called specialized motion area of the visual cortex. Transient forms of akinetopsia can be induced by the use of psychotomimetic substances such as LSD and mescaline. When occurring as an *\*aura* in the context of a paroxysmal neurological disorder such as migraine, transient forms of akinetopsia are referred to as *\*cinematographic vision*. Conceptually as well as phenomenologically, akinetopsia constitutes the counterpart of *\*Riddoch's phenomenon* (i.e. the inability to see stationary light stimuli, whereas the conscious perception of moving light stimuli remains intact). The term akinetopsia is used in opposition to the term *\*kinetopsia*. It should not be confused with the *\*slide show format* characteristic of some types of *\*visual hallucinations* or with the *\*quick-motion phenomenon*, in which time appears to pass too quickly.

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## Akoasm

Also referred to as acoasm, acousma, and akoasmic noise. All four terms stem from the Greek verb *akouein*, which means to hear. The term akoasm was introduced in or shortly before 1900 by the German neurologist Carl Wernicke (1848–1904) to denote relatively simple, *\*nonverbal* (or *\*nonvocal*) auditory hallucinations such as buzzing sounds, rappings, and rustling noises. Wernicke used the term akoasm in opposition to the term *\*phoneme* (which is used as a synonym for *\*verbal auditory hallucination*).

### References

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### Akoasmic Noise

see Akoasm.

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### Alcohol Hallucinosis

see Alcoholic hallucinosis.

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### Alcoholic Hallucinosis

Also known as alcohol hallucinosis and alcohol-induced psychotic disorder. All three terms refer to a nosological concept characterized by acute onset, a predominance of \*auditory hallucinations (although delusions and hallucinations in other sensory modalities may be present as well), a history of significant alcohol consumption, and the absence of disturbances of consciousness. The course of alcoholic hallucinosis is seen as more protracted than that of alcohol withdrawal or \*delirium tremens, i.e. on the order of several weeks to months. The introduction of the term alcoholic hallucinosis has been attributed to the Swiss psychiatrist Paul Eugen Bleuler (1857–1939). However, in his 1916 textbook of psychiatry, where he explains the general notion of \*hallucinosis and illustrates its use with reference to the term alcoholic hallucinosis (*Alkoholhalluzinose*), Bleuler shows himself indebted to the German neurologist Carl Wernicke (1848–1904). Moreover, in his discussion of the subject itself, Bleuler repeatedly refers to alcoholic hallucinosis as alcoholic madness (*Alkoholwahnsinn*). Wernicke, in turn, employs the expression chronic hallucinosis in alcoholics (*chronische Halluzinose bei Alkoholisten*) in his 1900 textbook. Before Wernicke, many others addressed more or less similar syndromes, using a variety of terms. As noted by the British addiction specialist Ilana Belle Glass, as early as 1847 the French author C.N.S. Marcel used the term *folie d'ivrogne* (drinking madness) to denote a symptom complex similar to alcoholic hallucinosis. Marcel has also been credited with being the first to distinguish this symptom

complex from \*delirium tremens. Whether or not this distinction is justifiable from a clinical and nosological point of view is a somewhat complex issue. As regards the clinical level of conceptualization, the distinction between delirium tremens and alcoholic hallucinosis has traditionally been defended by recourse to the alleged differences in clinical presentation, as well as to the differences in recommended therapeutic approach. As regards the scientific level of conceptualization, however, it has been argued that conditions such as alcohol intoxication, alcohol withdrawal, delirium tremens, and alcoholic hallucinosis may well be different manifestations of a single morbid process. Protagonists of this continuum hypothesis tend to downplay the purported clarity of consciousness in individuals with alcoholic hallucinosis and to stress the host of auxiliary symptoms that may accompany the condition, including physical symptoms characteristic of \*delirium and hallucinations in other than the auditory modality. A second school of thought, represented pre-eminently by Bleuler, conceptualizes alcoholic hallucinosis as a manifestation of an underlying – but until then latent – vulnerability to \*schizophrenia. As Bleuler wrote in 1916, “In cases with an ordinary, subacute course, I could always demonstrate with certainty or great probability, that besides the alcoholism a long-standing schizophrenia existed. In my experience, the (rare) acute cases were also somewhat abnormal in the direction of schizophrenia, although here the connection was less plainly pronounced.” In a footnote, Bleuler added, “Alcoholic madness could therefore be a mere syndrome concomitant to schizophrenia, induced by alcohol.” In addition to the continuum hypothesis and the hypothesis of alcohol as a precipitating factor for schizophrenia-like psychosis, various other hypotheses have been formulated. For example, a conceptual and pathophysiological kinship has been suggested between alcoholic hallucinosis and paraphrenia and between alcoholic hallucinosis and involuntional depression. But the nosological status of alcoholic hallucinosis has remained ambiguous. Neuroimaging and other promising techniques may well prove of value in unravelling the neurophysiological correlates of the syndrome, but the preliminary results of SPECT and PET studies in this area of research would seem to be hampered by a lack of specificity due to the absence of conceptual clarity in this matter.



As a nosological category, alcoholic hallucinosis is classified as a specific type of \*hallucinosis syndrome.

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### Alcoholic Twilight State

see Twilight state and hallucinations.

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### Alcohol-Induced Psychotic Disorder

see Alcoholic hallucinosis.

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### Aleman and Larøi's Definition of Hallucinations

In 2008 the neuroscientists André Aleman (b. 1975) and Frank Larøi defined hallucinations as follows: "A hallucination can be defined as a conscious sensory experience that occurs in the absence of corresponding external stimulation of the relevant sensory organ and has a sufficient sense of reality to resemble a veridical perception. In addition, the subject does not feel he or she has direct and voluntary control over the experience."

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### Alexander's Band

see Rainbow.

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### Algohallucinosis

The term algohallucinosis may be indebted to the Latin noun *algorismus* (which is a Latinization of Al-Khwarizmi, the last name of an Arabic mathematician (±780–±850) who published on arithmetic and algebra). It appears to connote 'a state of calculated hallucinatory activity'. The term was introduced in or shortly before 1920 by the Russian neurologist Johann Susmann Galant (1893–1937?) to denote a concept that treats hallucinations, in psychoanalytic fashion, as subconsciously elaborated wish-fulfillments. As Galant wrote, "We regard the hallucination as a wish, or better, a wish-fulfilment, the strivings of which were so powerful that they breached all the soul's compartments that were installed there by the laws of nature, and to the individual the wish became an incontrovertible reality that fulfilled the wish, although there exists nothing in the outside world that would back up the contents of that fulfilled wish. So the wish has found its fulfilment in an unnatural manner, via the path of hallucination." According to Galant, percepts only qualify as hallucinations when they arise suddenly and involuntarily. With his algohallucinosis concept, Galant sought to tone down the terminological fuzziness that – in his opinion – surrounded the hallucinations concept in the early 20th century. A second meaning of the term algohallucinosis stems from the work of the Belgian neuropathologist Ludo van Bogaert (1897–1989). In 1934, van Bogaert proposed the French neologism *algohallucinoise* (with the prefix *algo-* stemming from the Greek noun *algesis*, meaning pain) as a generic term for the notions of \*phantom pain and \*phantom limb. Van Bogaert motivated this proposal by asserting that "the patient, who does not have any doubt whatsoever concerning their reality, knows the illusory character of their localization, precisely in the way the individual suffering from hallucinosis sees images in an objective way without ever leaving any doubt about their lack of reality. It is for this reason that we propose to reintroduce the painful illusions of amputees within the more general context of the 'algo-hallucinoses'. This name, criticizable from other points of view, adequately expresses the two essential qualities of these disorders." The notion of algohallucinosis should not be confused with \*hallucinated pain.

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he also draws attention to the part played by knowledge and inference in the mediation of illusions.

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**Algopsychalia**

Also known as psychalgia, phrenalgia, mind pain, soul pain, psychic pain, and psychogenic pain. The term algopsychalia comes from the Greek words *algos* (pain) and *psuchè* (life breath, spirit, soul, mind). It translates loosely as 'mental pain'. It refers to a bodily sensation of pain that is recognized by the individual as being mental rather than physical in origin. Algopsychalia tends to be classified as a \*psychogenic hallucination or as a variant of \*sensory conversion. Conceptually, it is related to \*hallucinated pain. However, it should not be confused with pain syndromes such as \*allodynia, \*dysaesthesia, \*paraesthesia, and \*hyperpathia.

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**Alice in Wonderland Effect**

see Alice in Wonderland syndrome.

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**Alice in Wonderland Syndrome**

Also known as Alice in Wonderland effect, Wonderland syndrome, and syndrome of Alice in Wonderland. The term syndrome of Alice in Wonderland was introduced in or shortly before 1955 by the British psychiatrist John Todd (1914–1987) to denote a rare group of symptoms that include subjective feelings such as derealization, depersonalization, and somatopsychic duality, and perceptual symptoms such as illusory changes in the size, distance, or position of stationary objects within the subject's visual field (i.e. \*metamorphopsias such as \*micropsia, \*macropsia, \*macroproxiopia, \*microtelepsia, \*teleopsia, and \*plagiopsia), illusory feelings of levitation, and illusory alterations in the passage of time (i.e. the \*quick-motion phenomenon and other types of \*time distortion). The nature of these symptoms suggests that especially the parietal lobe may be involved in their mediation. Todd also includes \*hyperschematia or left size distortion, a condition associated with neglect, which in turn is associated with lesions affecting the right hemisphere. Today many of the \*body schema illusions (such as \*splitting of the body image) are also included in the operational definition of the Alice in Wonderland syndrome. As noted by Todd in 1955, there are few examples of the complete Alice in Wonderland syndrome to be found in the literature. Most reports are concerned with one or more separate symptoms occurring in association with \*migraine aura, \*psychic aura, temporal lobe epilepsy, cerebral lesions, \*delirium of fever, \*hypnagogic and \*hypnopompic states,

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**Al-Hasan, Abu Ali**

see Alhazan.

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**Alhazan (c. 965–1040)**

Alhazan, whose real name was Abu Ali al-Hasan ibn al-Haytham, is also known under the names al-Basra (from Basra, in what is now Iraq), and al-Misri (from Egypt). He was an Arab mathematician, who has been credited with providing the earliest known classification of \*illusions. In his work on optics Alhazan focuses primarily on \*physical illusions such as reflections from curved surfaces and atmospheric refraction, but



**Fig. 3** Alice in Wonderland. Illustration by John Tenniel

acute labyrinthine vertigo, a clinical diagnosis of \*schizophrenia, or a history of psychoactive substance abuse (notably the use of \*hallucinogens such as \*dextromethorphan, LSD, or mesca-

line). Occasionally, the symptoms of the Alice in Wonderland syndrome are mentioned as early signs of a viral infection (such as mononucleosis infection, Epstein–Barr virus infection, and Coxsackie virus B1 infection). In some cases the symptoms belonging to the Alice in Wonderland syndrome are classified as variants of \*psychic aura. The term Alice in Wonderland syndrome refers to the protagonist in the book *Alice's Adventures in Wonderland* by Lewis Carroll (1832–1898) whose experiences are reminiscent of symptoms such as micropsia, macropsia, \*microsomatognosia, and \*macrosomatognosia. Since Carroll himself probably suffered from migraine, it was suggested in 1952 by the American neurologist Caro W. Lippman (1886–1954) that the author may have experienced at least some of these symptoms himself. An alternative explanation for Carroll's references to the perceptual symptoms noted above was suggested by the American historian and author Michael Carmichael. According to Carmichael, Carroll had either read about the hallucinogenic effects of the mushroom *Amanita muscaria* or possibly even experimented with the mushroom himself.

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#### Alkaloids and Hallucinations

The term alkaloid is indebted to the Latin noun *alkali*, which in turn stems from the classic Arabic expression *al qily*, commonly translated as 'he roasted', or 'he grilled'. The expression *al qily* is said to refer to the scorched ashes of the

hairy seablite (i.e. *Bassia hirsuta*). In biology and biochemistry, the term alkaloid is used as an umbrella term for one of the largest and most diverse groups of secondary metabolites occurring in living organisms. Among the 50,000 or so known natural products, over 12,000 substances are classified as alkaloids. They are defined by the American chemist S. William Pelletier as follows: "An alkaloid is a cyclic compound containing nitrogen in a negative oxidation state which is of limited distribution in living organisms." Using the criterion of psychoactive effect as a guiding principle, alkaloids possessing hallucinogenic properties (when administered in a sufficiently high dose) have been classified as \*delirians. Many – although certainly not all – alkaloids are derived from amino acids. Traditionally, they have been isolated from flowering plants. However, they are also known to occur in micro-organisms, marine invertebrates, insects, and higher animals. Due to their chemical structure, some of the biologically active alkaloids are able to bind to, and interact with, the receptors of neurotransmitters in humans. Thus some of them have the potential to stimulate or inhibit the action of chemical transmitter substances in the CNS such as acetylcholine, epinephrine, norepinephrine, gamma-amino butyric acid (GABA), dopamine, and serotonin. Alkaloids have been used since ancient times as poisons, potions, therapeutics, \*entheogens, \*hallucinogens, and for many other purposes. Assyrian clay tablets from around 2,000 BC are indicative of an early knowledge of alkaloid-containing plants such as *Papaver somniferum*, *Atropa belladonna*, and *Mandragora officinarum*. Some of the alkaloids traditionally used as arrow poisons in Africa and South America have proved to be potent therapeutics. Ouabain and k-strophanthin are used to treat acute cardiac insufficiency, quinine to prevent as well as treat malaria, physostigmine to treat glaucoma and myasthenia gravis, \*reserpine to manage hypertension, and ajmaline to treat cardiac arrhythmias. Some well-known alkaloids that are used for both therapeutic and recreational purposes are caffeine (an alkaloid of the purine group), nicotine (pyridine group), opium (isoquinoline group), mescaline and amphetamine (phenethylamine group), and psilocybin, dimethyltryptamine (DMT), and bufotenine (indole group). A person intentionally employing alkaloids for the purpose of exploring the psyche may be called a \*psychonaut.

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## Allachaesthesia

Also known as allachesthesia, allesthesia, allaesthesia, allochaesthesia, allochesthesia, alloesthesia, and atopognosis. The term allachaesthesia comes from the Greek words *allache* (elsewhere) and *aisthanesthai* (to notice, to perceive). It translates loosely as 'perception in a different place' and refers to a mislocation of tactile sensations to a location other than the one that is actually being touched. The term allachaesthesia was introduced in or shortly before 1894 by the British neurologist Thomas Grainger Stewart (1877–1957) to denote horizontal or diagonal displacements of localization for touch confined to the ipsilateral side of the body. Stewart noted that this phenomenon bore a resemblance to \*allochiria (i.e. a condition characterized by a mislocation of sensory stimuli to the corresponding *opposite* half of the body). Today allochiria is generally considered a variant or subset of the class allachaesthesia. Two variants of allachaesthesia that occur in other sensory modalities are gustatory allachaesthesia and \*visual allachaesthesia. Another condition phenomenologically related to allachaesthesia is \*spinal cord damage-induced synaesthesia. It is unlikely, however, that the two phenomena are related in a pathophysiological sense as well. A condition in which unilateral stimulation produces bilateral tactile sensations is called \*synchiria.

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## Allesthesia

see Allachaesthesia.

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## Alley

see Tunnel.

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## Allocheiria

see Allochiria.

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## Allochiria

Also known as allocheiria. Both terms stem from the Greek words *allos* (other) and *cheir* (hand), translating loosely to 'other hand'. The term allochiria was introduced in or shortly before 1882 by the Austrian neuroanatomist and neuropathologist Heinrich Obersteiner (1847–1922) to denote a "confusion of sides", or a mislocation of sensory stimuli to the corresponding opposite half of the body. Allochiria has been observed mainly in the context of neglect, which is usually due to a lesion affecting the right parietal lobe. It has also been described in conditions such as tabes dorsalis and other myelopathies, in diffuse organic brain syndromes, in parieto-occipital tumours, and in hysteria. The majority of cases of allochiria are related to the tactile sense, but allochiric responses can occur in other sensory modalities as well. In \*auditory allochiria, a person speaking from one side is responded to as if someone were speaking from the other side. In \*visual or \*optical allochiria, stimuli presented within one hemifield of vision are attributed to a source on the contralateral side. Allochiric responses have also been described in the sensory modalities of pain, proprioception, temperature, smell, and taste, as well as in reflex electrical movements. Conceptually as well as phenomenologically, allochiria is related to \*allachaesthesia. The American neurologists Kimford Meador et al. have drawn attention to the original descriptions and word derivations of allochiria and allachaesthesia, identifying the work of the Welsh neurologist and psychoanalyst Alfred Ernest Jones (1879–1958) as

the principal source of confusion in this matter. As Meador et al. point out, in 1907 Jones redefined both notions in an attempt to increase their diagnostic specificity, depicting both conditions as a positive indication of the presence of hysteria. Today allochiria is generally considered a variant or subset of allachaesthesia, and neither condition is now associated exclusively with hysteria. As Meador et al. recapitulate in their 1991 paper on the subject, "*Allachaesthesia* is a condition in which a sensory impression is mislocated to a remote position, and *allochiria* denotes mislocations to the corresponding opposite half of the body or space." Another condition phenomenologically related to allochiria is \*spinal cord damage-induced synaesthesia. It is unlikely, however, that the two phenomena are related in a pathophysiological sense as well.

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## Allodynia

The term allodynia comes from the Greek words *allos* (other) and *odunè* (pain), translating loosely to 'other pain'. It is used to denote a condition characterized by pain due to a stimulus that does not normally evoke pain. Pathophysiologically, allodynia involves a change in the quality of nociception, whether tactile, thermal, or of any other origin, which is associated with an alteration in the specificity of the tactile sensory modality. Some examples of allodynia are cold allodynia, heat allodynia, and tactile allodynia. The term allodynia is used in opposition to the term \*hyperalgesia, which represents an augmented response of pain receptors to painful (as opposed to normal) stimuli. Conceptually, allodynia and hyperalgesia should not be confused with other pain syndromes, such as \*algopsychalia, \*dysaesthesia, \*paraesthesia, \*hyperpathia, and \*hallucinated pain. The issue whether pain can also be experienced in a hallucinated form is a knotty philosophical issue.

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**Alloesthesia**

see Allachaesthesia.

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**Allotopagnosia**

see Autotopagnosia.

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**Allucinatio**

see Hallucination.

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**Altruistic Hallucination**

The term altruistic hallucination is indebted to the French noun *altruisme*, coined by the French philosopher Auguste Comte (1798–1857), which translates to unselfishness. The term *hallucination altruiste* was introduced in or shortly before 1891 by the French physician and mesmerist Charles Féré (1852–1907) to denote a hallucination depicting a human person to whom a sensation, a wish, or a feeling is conveyed or attributed. As Féré admits, “Examples can demonstrate it better than a lengthy description. 1. An epileptic who, during the aftermath of his convulsive seizures, often displays a certain degree of paresis on the right side, sometimes displays a delirium at the same time, during which he says: ‘Give him a cigarette, light it, the poor man does not have a right hand, stroke his hand, his fingers are tingling, etc.’ 2. A young man, having a typhoid fever, being awake, and apparently healthy, repeats in peace and quiet, ‘Give him something to drink, he is very thirsty, he is not comfortable in his bed.’ 3. A lady, who was going to succumb under a chronic infection, said several hours before

she died, without having displayed any other mental symptoms, ‘I can not get up to urinate; but he can go in my place.’” The notion of the altruistic hallucination might well fit in with the characteristics of the \*misidentification syndrome. As noted by the French psychiatrists Henri Hécaen (1912–1983) and Julian de Ajuriaguerra (1911–1993), “The ill and suffering individual transposes the endured ardour and pain to this double, for whom he feels compassion and pity.” Conceptually and phenomenologically, and perhaps also pathophysiologically, Féré’s notion of the altruistic hallucination is related to \*somatoparaphrenia, a condition described in individuals suffering from a left-sided paralysis due to a unilateral (i.e. right-sided) or bilateral lesion of the parietal lobe. Paraphrasing the words of the Austrian-American neuropsychiatrist Josef Gerstmann (1887–1969), both syndromes can be said to fall under the heading of “anosognosia which, in addition to the experience of absence, is associated with illusions or distortions concerning the perception of and confabulations or delusions referring to the affected limb or side”.

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**Alucinari**

Also written as \**halucinari*, the Latin verb from which the term hallucination is derived. The terms *alucinari* and *halucinari* probably came into use during the first century AD. At the time, these words had the connotation of wandering mentally or being absent-minded. They have their root in the Greek verb *aluein*, which means to wander, to be distraught, to be beside oneself, or to be outrageous. It has been speculated that

the word ending *-cinari* might stem from the Latin verb *vaticinari*, which means to rave. As the American neuroanatomist Fred H. Johnson says, “*Hallucination* is an appropriate medical word, and it is more than a coincidence that ‘to wander in mind’ is the meaning of *alucinari* from which is derived *hallucinatus* and the term *hallucination*. The ending *cinari* is due to the influence of *vaticinari*, meaning to rave, and comes onomatopoeically from the hooting of owls and at first indicates behavior like that of night birds, such as an oil bird.”

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### Alucinatio

see Hallucination.

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### Alusia

The term *alusia* comes from the Greek verb *aluein*, which means to wander, to be distraught, to be beside oneself, or to be outrageous. It was introduced in or shortly before 1823 by the British surgeon John Mason Good (1764–1827) as a generic term for \*illusions and hallucinations.

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### Alzheimer’s Disease and Hallucinations

Alzheimer’s disease is also known as senile dementia of the Alzheimer type (SDAT). Both eponyms refer to the German psychiatrist Alois Alzheimer (1864–1915), who in 1906 was the first to present post-mortem histological findings associated with senile dementia. The German name *Alzheimersche Krankheit* was coined in or shortly before 1910 by Alzheimer’s superior Emil Kraepelin (1856–1926) and included in the eighth

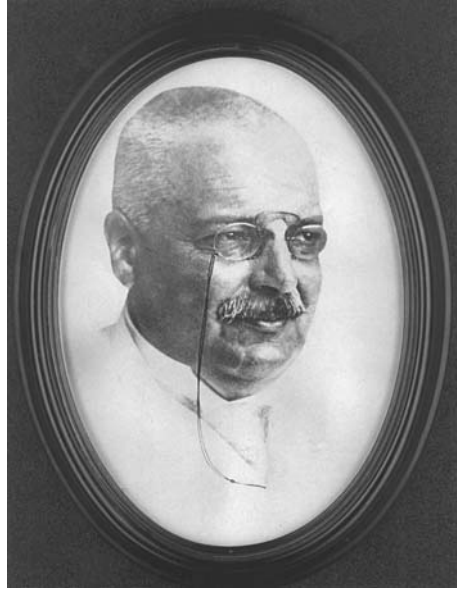


Fig. 4 Alois Alzheimer

edition of the latter’s textbook of psychiatry to denote a presenile form of dementia. The relation between Alzheimer’s disease, presenile dementia, and senile dementia has been a subject of debate for more than 70 years. Today Alzheimer’s disease is conceptualized as a neurological disease characterized by the widespread degeneration of brain cells, together with the formation of neuritic plaques and neurofibrillary tangles, and etiologically linked to the majority of cases included in the general clinical syndrome dementia. The very first case report of Alzheimer’s disease, published in 1906 by Alzheimer himself, involves a 51-year-old woman who experienced delusions of jealousy and \*auditory hallucinations. The prevalence of hallucinations in individuals with Alzheimer’s disease has since been found to vary from 4 to 76%. This broad variation in prevalence rates is commonly attributed to the heterogeneity of the various populations under study, as well as to variations in the different study designs. Among the hallucinations occurring in Alzheimer’s disease, the \*visual and \*auditory ones are the most prevalent; and yet hallucinations in Alzheimer’s disease may occur in any of the other sensory modalities as well.

Their onset, duration, and severity do not seem to follow any identifiable pattern. It has been suggested by some that they fluctuate over time, and by others that they tend to increase over time, as the underlying disease progresses. However, there are authors who report little progressive worsening over time. Pathophysiologically, the mediation of hallucinations in Alzheimer's disease is considered to be as diverse as the disease's underlying pathology. It has been suggested that the pre-subiculum and middle frontal cortex play a key role in their mediation, while other authors have maintained that the neurobiological correlates of these hallucinations are non-specific, i.e. they do not differ from those in other diseases associated with hallucinations. Etiologically, the mediation of hallucinations in Alzheimer's disease is associated with direct cerebral damage to the perceptual system, due to cortical and subcortical cell loss, and the presence of neuritic plaques and neurofibrillary tangles. In addition, it has been suggested that these hallucinations can be mediated indirectly by the disturbances in dopaminergic, adrenergic, serotonergic, and/or cholinergic function that frequently occur in individuals with Alzheimer's disease. The disease's characteristic neurocognitive disturbances would seem to play no more than a pathoplastic role in the mediation of hallucinations, although a more prominent role has also been suggested. An important confounder in all studies of hallucinations occurring in the context of Alzheimer's disease is the disorder's comorbidity with conditions such as parkinsonism, metabolic disorders, ocular disease, and hearing loss. The American neuropsychologists Robert S. Wilson et al. found that the presence of hallucinations in Alzheimer's disease is associated with an increased mortality rate. The basis of this relation is as yet unknown.

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## Amanita Reverie

A term used to denote a hallucinatory state attributed to intoxication with the mushroom *Amanita muscaria*. *A. muscaria* is known under many other names, including *A. formosa*, *A. mexicana*, *A. muscaria*, *Agaricus muscarius*, fly mushroom, fly amanita, and fly agaric. The name Amanita comes from the Greek noun *amanitès*, which refers to a mushroom with a bright red cap and white warts – in other words, the archetypical mushroom depicted in children's books and fairy tales. It has also been speculated that the term Amanita may derive from Amanon, the name of a mountain in Cilicia, Asia Minor (now southern Turkey). The names fly mushroom, fly amanita, and fly agaric derive from the former mid-European custom of crumbling Amanita mushrooms into a saucer of water and placing it near a window to kill off flies. One of the oldest sources in which the name fly agaric is mentioned is the *Kräuterbuch* published in 1440 by the German physician Johannes Hartlieb (±1400–1468). In biology the name Amanita is used to denote a genus of mushrooms that includes over 600 species. Many of these mushrooms are edible, but due to toxic species such as the death cap (*A. phalloides*) and the destroying angel (*A. virosa* and *A. bisporigera*), the genus Amanita is responsible for some 95% of all deaths resulting from mushroom poisoning. The most potent toxin that has been isolated in these mushrooms is known as alpha-amanitin. *A. muscaria* is a species known since ancient times, which has been used as an \*entheogen by \*mystics and shamans in Europe, Asia, and the Americas. It has been speculated that it may well be the oldest entheogen or \*hallucinogen known to mankind. Today it is seldom used for recreational purposes. A person intentionally employing *A. muscaria* for the purpose of exploring the psyche may be called a \*psychonaut. The identified psychoac-





**Fig. 5** Amanita mushroom with lilliputian hallucinations. Illustration by JDB

tive compounds of *A. muscaria* include the isoxazole derivatives ibotenic acid, muscimol, and muscazone, as well as muscarine. It is believed that the alkaloid muscimol acts as the mushroom's primary psychoactive substance. *A. muscaria* can be administered either orally or via the lungs, through smoking. As the urine of the Amanita eater also has hallucinogenic properties, up to five persons can benefit from a single ingested mushroom – provided that they are prepared to drink each other's urine in a serial manner. When consumed in small quantities, *A. muscaria* is said to have stimulating properties that allow for exceptional physical performances. This thesis has been debated, however, by authors who state that the effects of *A. muscaria* resemble those of opium. *A. muscaria* intoxication may entail a period of 'sleep' lasting from a half-hour to 2 hours, during which the subject is said to remain largely aware of all regu-

lar sensory input. After that incubation period, with or without sleep, the subject tends to experience a so-called amanita reverie, i.e. a 5- to 10-hour stretch of \*visual and/or \*auditory hallucinations. The occurrence of \*hyperaesthesia, \*lilliputian hallucinations, \*gulliverian hallucinations, \*synaesthesias, and \*metamorphopsias (including \*macropsia and \*micropsia) has been reported as well. The duration of the Amanita reverie seldom exceeds 24 hours, although an occasional duration of 5 days has been reported. Deaths due to the consumption of *A. muscaria* are very rare. However, the typical hallucinatory state is occasionally followed by paranoid \*psychosis, \*delirium, convulsions, and even coma. It has been suggested by the American historian and author Michael Carmichael that the perceptual experiences described in the book *Alice's Adventures in Wonderland* were based on Lewis Carroll's knowledge of – or even his own

experiences with – the hallucinogenic effects of *A. muscaria*.

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## Amaurosis and Visual Hallucinations

In Greek, the noun *amaurōsis* refers to a darkening or loss of vision. In present-day biomedicine, it is used to denote a type of visual loss that is not due to intraocular pathology. A congenital type of amaurosis is known as \*Leber's congenital amaurosis. Transient types of amaurosis are referred to as \*amaurosis fugax. All types of amaurosis can theoretically be complicated by \*visual hallucinations (as in the \*Charles Bonnet syndrome, for example). Such visual hallucinations are sometimes referred to as \*ophthalmopathic hallucinations.

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## Amaurosis Fugax and Visual Hallucinations

The noun *amaurōsis* is Greek for darkening or loss of vision; the adjective fugax comes from the Latin noun *fuga*, or flight. The term amaurosis fugax translates loosely as transient blindness. It is used to denote a sudden, painless, temporary loss of vision that can be either partial or total in nature. This loss of vision typically lasts from a few seconds to some minutes. Pathophysiologically, amaurosis fugax has tradi-

tionally been classified as a variant of transient ischaemic attack (TIA). Etiologically, it is associated with a variety of embolic, haemodynamic, ocular, and neurological conditions. Amaurosis fugax occurring in the context of epilepsy is referred to with the term \*post-ictal amaurosis. It has been speculated that many of the so-called idiopathic cases of amaurosis fugax are attributable to local vasospasms. Although rare, amaurosis fugax can be accompanied by \*visual hallucinations of varying complexity. In a group of 31 individuals with giant cell arteritis, the Israeli physicians Gideon Neshet et al. found 5 subjects with permanent visual loss complicated by visual hallucinations and 1 with amaurosis fugax complicated by visual hallucinations. Such visual hallucinations occurring in combination with visual impairment have also been referred to as \*ophthalmopathic hallucinations.

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## Ambiguity

see Ambiguous illusion.

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## Ambiguous Figure

see Ambiguous illusion.

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## Ambiguous Illusion

Also known as ambiguous figure, ambiguity, reversible figure, and bistable figure. All five terms refer to a \*cognitive illusion elicited by images or objects that are capable of bringing about a perceptual 'switch' between the alternative interpretations of a given percept, rendering one meaningful configuration now, and then another. Some well-known examples of illusions classified as ambiguous ones are shadows, hazes, appar-

ent motion, the \*Necker cube, \*Jastrow's duck-rabbit, and \*Rubin's figure. The term ambiguous illusion tends to be used in opposition to the terms \*distortion illusion, \*paradox illusion, and \*fiction illusion.

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## Amblyopia and Hallucinations

Amblyopia is also known as 'lazy eye'. The term comes from the Greek noun *amblyōpia*, which means weakness of vision. It is used to denote an indistinct or poor vision, usually – although not necessarily – limited to one eye. The lifetime prevalence of amblyopia is estimated to lie between 1 and 5%. Amblyopia may go unnoticed in milder cases, due to compensation by the stronger eye. Severe amblyopia, however, can present itself in the form of diminished depth perception, diminished spatial acuity, diminished sensitivity to contrast, and in some cases reduced sensitivity to motion. Etiologically, amblyopia is associated with a variety of conditions, including visual deprivation early in life (as in developmental amblyopia), retrochiasmal lesions to the visual system (as in \*cerebral amblyopia), and astigmatism (as in meridional amblyopia). In rare instances, amblyopia can be complicated by \*visual hallucinations, referred to sometimes as \*ophthalmopathic hallucinations. The term tobacco amblyopia is reserved for cases of diminished visual acuity due to extreme nicotine intoxication.

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compliance and referral patterns. *Clinical & Experimental Ophthalmology*, 32, 175–179.

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## AMDP's Definition of Hallucinations

The 1982 *Manual for the Assessment and Documentation of Psychopathology* (AMDP) defines hallucinations as follows: "Hallucinations are perceptual experiences without a corresponding stimulus in the environment. One can hallucinate in all sense modalities and frequently in more than one. The judgment of reality is more or less narrowed or suspended."

### Reference

- Guy, W., Ban, T.A., eds. (1982). *The AMDP-system: Manual for the assessment and documentation of psychopathology*. Berlin: Springer.

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## AMDP's Definition of Illusions

The 1982 *Manual for the Assessment and Documentation of Psychopathology* (AMDP) defines illusions as follows: "Distortion or misinterpretation of a real perception. Falsified actual perceptions; the presence of a real object (percept) differentiates an illusion from a hallucination."

### Reference

- Guy, W., Ban, T.A., eds. (1982). *The AMDP-system: Manual for the assessment and documentation of psychopathology*. Berlin: Springer.

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## Amentia

see Paranoia hallucinatoria.

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## American Mandrake and Hallucinations

see Mayapple and hallucinations.

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### American Psychiatric Association's Definition of Hallucinations

In 1975, the American Psychiatric Association (APA) defined hallucinations as follows: "A false sensory perception in the absence of an actual external stimulus. May be induced by emotional and other factors such as drugs, alcohol, and stress. May occur in any of the senses."

#### Reference

American Psychiatric Association (1975). *A psychiatric glossary. Fourth revised edition*. New York, NY: Basic Books.

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### American Psychological Association's Definition of Hallucinations

In 2007, the American Psychological Association (APA) defined hallucinations as follows: "A false sensory perception that has a compelling sense of reality despite the absence of an external stimulus."

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### Amphetamine Psychosis and Amphetamine-Induced Hallucinations

Amphetamine is known under many names, including amp, crystal, phenylisopropylamine, speed, sulph, sulphate, and whizz. The name amphetamine is an acronym of alpha-methyl-phenyl-ethylamine. It is used to denote a subgroup of the CNS stimulants, as well as a prototype of that subgroup called racemic amphetamine, or simply amphetamine. As a group, amphetamines are classified as alkaloids of the phenethylamine group. They are closely related in chemical structure and pharmacology to other sympathomimetic amines such as norepinephrine and \*ephedrine. Because of their stimulating effect, they are also known as 'uppers'. Amphetamine was synthesized for the first time

in Germany in 1887 by the Romanian chemist Lazăr Edeleanu (1861–1941), who gave it the name phenylisopropylamine. It was only after its resynthesis in 1927 by the British-American chemist Gordon Alles (who also introduced the name amphetamine) that serious attempts were made to devise a practical application. In 1932 the amphetamines were introduced in biomedicine in the form of Benzedrine, a decongestant nasal inhaler designed for individuals suffering from asthma, hay fever, or flu. During World War II, amphetamines were distributed to German, Italian, and Allied combat soldiers to increase wakefulness, alertness, endurance, and aggressiveness. Today the biomedical application of amphetamines is largely restricted to the treatment of neuropsychiatric disorders such as attention-deficit/hyperactivity disorder (ADHD) and narcolepsy. Amphetamines can be administered either orally, in the form of a tablet or a powder, or intravenously. The term 'bomber' is used to denote amphetamine powder that is swallowed wrapped in a cigarette paper. The principal central effects of amphetamine intoxication are increased attention, prolonged arousal, euphoria, a sense of increased energy and self-confidence, more rapid thought processes and decision-making, decreased appetite, weight loss, and a suppression of feelings of fatigue. These effects are attributed primarily to stimulation of the reticular formation. It has been reported that brief \*psychotic reactions, lasting for up to several hours, can be provoked in any individual when a large enough dose of amphetamine is administered. In actual practice, however, such reactions are relatively rare. Most reports of amphetamine psychosis are related to the use of escalating doses of amphetamine and/or chronic high-dose binge administration. The mental condition characteristic of amphetamine psychosis can be described as a paranoid psychosis with delusions of reference and persecution, as well as hallucinations, occurring to a clear sensorium. The hallucinations and \*illusions arising in the context of amphetamine psychosis tend to be \*visual, \*auditory, and occasionally \*compound in nature, although \*somatic, \*tactile, and \*olfactory hallucinations have also been reported. \*Formicative hallucinations occurring in the context of amphetamine use are known as \*crank bugs. The hallucinogenic and other psychotic effects of amphetamine intoxication are attributed primarily to overstimulation of the dopaminergic system. After the

cessation of amphetamine consumption, these effects generally abate within several days to weeks. In combination with a vulnerability to psychosis, however, amphetamine use may result in prolonged and/or recurrent psychotic episodes, indistinguishable from those in individuals with a clinical diagnosis of \*schizophrenia.

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## Anabolic Steroids and Hallucinations

Anabolic steroids are also known as anabolic-androgenic steroids, or AASs for short. In popular parlance, the group of anabolic steroids is sometimes referred to as 'steroids'. The term anabolic steroid can be traced to the Greek verb *anaballein* (to toss in the air), the name *sterol* (i.e. a compound of cholesterol), and the word ending -oid. It is used to denote a class of \*steroids that interact with androgen receptors and that play a role in the stimulation of muscle and bone synthesis. AASs are chemically related to testosterone. They are classified as either endogenous (i.e. 'natural') or exogenous (i.e. synthetic) in nature. Endogenous AASs have a function in the development and maintenance of masculine body characteristics such as muscle bulk and secondary sex characteristics. Exogenous AASs are used in biomedicine for the build-up of cellular tissue in muscles. In sport, they are used for aesthetic and performance-related purposes. Athletes sometimes use AASs in doses of up to 100 times the recommended therapeutic dose. In their current form, AASs were used for the first time by German soldiers during World War II in an attempt to increase strength, endurance, and combativeness. The simultaneous use of multiple oral and/or injectable preparations is known as 'stacking'. The use of exogenous AASs in so-called supra-pharmacological doses – as well as the withdrawal from such doses – is notorious

for the many adverse physical and psychological effects. The possible physical side effects include benign and malignant liver tumours, testicular atrophy, gynaecomastia, hypertension, and metabolic disorders such as abnormal glucose tolerance and hypercholesterolaemia. Among the psychological side effects are euphoria, hypomania, mania, anxiety, low self-esteem, depression, fatigue, delusions of grandiosity, paranoia, paranoid delusions, and a syndrome nicknamed 'roid rage', which is characterized by an increase in irritability, aggressiveness, and physically violent behaviour. Yet another complication of the use of AASs is \*steroid psychosis, a condition characterized by a variety of symptoms, such as attention deficits, memory impairment, formal thought disorder, insomnia, euphoria, hypomania, anxiety, depression, agitation, mutism, paranoia, delusions, \*hyperacusis, \*body schema illusions, \**Gedankenlautwerden*, and \*auditory as well as \*visual hallucinations. After the cessation of steroid use, spontaneous remittance may take 2 weeks to 7 months, with 80% of the cases reported in the literature having remitted by the sixth week. The administration of antipsychotics tends to shorten the remittance period significantly. The duration of steroid-induced \*delirium is usually shorter. After the cessation of steroid administration, delirious states are reported to abate within 1 week. However, steroid psychosis and delirium occasionally develop into prolonged and/or recurrent psychotic states indistinguishable from those in individuals with a clinical diagnosis of \*schizophrenia.

### References

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## Anaesthesia

Also written as anesthesia. The term anaesthesia comes from the Greek noun *anaisthēsia*, which means numbness. In a broad sense, it refers to a loss or impairment of sensitivity to stimuli in any

of the sensory modalities. As a rule, however, the term is used in a more restricted sense, to denote a loss or impairment of sensitivity to stimuli in the somatosensory modality. These stimuli can be of a tactile, thermal, chemical, or any other origin. Some examples of anaesthesia are insensitivity to needle pricks or cuts, to hot or cold stimuli, and indifference to ammonia held under the nose. Etiologically, the mediation of anaesthesia is associated with either peripheral or central nervous tissue damage (or tissue manipulation, as in acupuncture), with the administration of anaesthetics or other chemical substances, or with psychological mechanisms. Some examples of psychological mechanisms capable of inducing anaesthesia are stress, suggestion, \*ecstasy, \*trance, rapture, hypnotic states, \*dissociation, somnambulism, conversion, and \*psychosis. It has long been debated whether psychologically induced anaesthesia is comparable to 'true' (i.e. measurable, physiological) anaesthesia, or to a kind of role-playing behaviour, where the subject acts *as if* the stimulus in question has not been perceived. However, measurements of physiological reactions as well as functional imaging studies would seem to indicate that psychologically induced anaesthesia leads to actual, though reversible organic changes. The term anaesthesia is used in opposition to the term \*hyperaesthesia. The specific loss or impairment of sensitivity to painful stimuli is usually referred to as \*analgesia. For the specific loss or impairment of sensitivity to temperature, the term thermoanaesthesia is used. The terms \*total anaesthesia, generalized anaesthesia, and systematized anaesthesia are reserved for psychologically induced states of total body numbness, such as those described in classical studies on hypnotism and hysteria. Total anaesthesia should not be confused with \*acnesthesia, which is conceptualized as a condition characterized by a total loss of awareness of physical existence, and with Cotard's syndrome, a condition in which the affected individual can have the delusional conviction (rather than the perceptual experience) that his or her body has ceased to exist.

### References

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## Anaesthesia Dolorosa

Also known as painful anaesthesia. Anaesthesia dolorosa is also written as anesthesia dolorosa. Both terms stem from the Greek noun *anaisthèsia* (numbness) and the Latin adjective *dolorosa* (of grief, of sorrow). They are used to denote a spontaneously occurring, severe type of pain located in an anaesthetic zone. Facial anaesthesia dolorosa is an uncommon complication of surgical treatments for trigeminal neuralgia. Pathophysiologically, anaesthesia dolorosa tends to be attributed to \*deafferentiation. When caused by neurosurgical lesions, the term \*central pain is preferred over anaesthesia dolorosa. The issue whether pain can also be experienced in a hallucinated form is a knotty philosophical issue.

### References

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## Analgesia

The term analgesia comes from the Greek words *an* (not) and *algos* (pain). It is used to denote a specific loss or impairment of sensitivity to painful stimuli of a tactile, thermal, chemical, or other physical origin. Etiologically, the mediation of analgesia is attributed to either peripheral or central nervous tissue damage, to the administration of anaesthetics or other chemical substances, or to psychological mechanisms. Some examples of psychological mechanisms associated with the mediation of analgesia are stress, \*ecstasy, \*trance, rapture, hypnotic states, somnambulism, \*dissociation, \*sensory conversion, and \*psychosis. As noted by the Swiss psychiatrist Eugen Bleuler (1857–1939), analgesia can be profound in individuals with a clinical diagno-

sis of \*schizophrenia. As Bleuler wrote, “Even in well-oriented patients one may often observe the presence of a complete *analgesia* which includes the deeper parts of the body as well as the skin. The patients intentionally or unintentionally incur quite serious injuries, pluck out an eye, sit down on a hot stove and receive severe gluteal burns, etc.” The term analgesia is used in contrast to the term \*hyperalgesia.

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## Anesthesia

see Anaesthesia.

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## Angel Dust and Hallucinations

see Phencyclidine-induced hallucination.

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## Angel's Trumpet and Hallucinations

see Datura hallucination.

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## Animals and Hallucinations

It has been suggested that not only humans but also other animals possess the capacity to hallucinate. Although hallucinatory phenomena experienced by animals are even less accessible to scientific research than those in humans, field and laboratory observations of animal reactions to psychoactive substances have led researchers to conclude that animals have the capacity not only to hallucinate but also to develop cravings for and addictions to psychoactive plants and other substances. However, the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) and others have warned against premature conclusions in

this area of research. As noted by Klüver, who carried out numerous experiments with both \*psychotomimetic substances and animals, “I am unfortunately aware that the literature nowadays is full of ‘hallucinated’ cats and monkeys. But a monkey grabbing into the air under the influence of a supposedly ‘hallucinogenic’ substance does not necessarily grab for hallucinated objects; a monkey who scratches himself does not necessarily itch, and when sticking out his tongue rhythmically does not necessarily have paresthesias. It requires evidence of a sort not easily obtainable to justify such inferences from motor movements or objectively observable changes.” Animals whose body parts or excretions are known to produce \*hallucinogenic effects in humans are referred to as \*psychoactive fauna.

### References

- Klüver, H. (1965). *Neurobiology of normal and abnormal perception*. In: *Psychopathology of perception*. Edited by Hoch, P.H., Zubin, J. New York, NY: Grune & Stratton.
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## Ann the Word

see Lee, Ann.

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## Anomalous Colour Vision

see Colour vision deficiency.

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## Anomalous Trichromasy

see Anomalous trichromatism.

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## Anomalous Trichromatism

Also known as anomalous trichromasy. Both terms are used to denote those types of \*colour vision deficiency in which one of the retinal

cones malfunctions in such a way that the resulting deficiency is relative rather than absolute in nature. In trichromatic species such as Man, three types of anomalous trichromatism are distinguished, called \*protanomaly, \*deutanomaly, and \*tritanomaly. The introduction of the term anomalous trichromatism has been attributed to the German colour physicist and physiologist Arthur Peter König (1856–1901). It is used in contrast to the terms \*monochromatism and \*dichromatism. In the latter conditions the colour vision deficiency is absolute, due to the absence of one or more of the retinal cone pigments.

### References

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### Anorexia and Hallucinations

see Fasting-induced hallucination.

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### Anosognosia and Hallucinations

The term anosognosia comes from the Greek words *a* (not), *nosos* (illness), and *gnōsis* (insight). It translates loosely as 'lack of knowledge of one's illness'. The French neologism *anosognosie* was introduced in or shortly before 1914 by the Polish-French neurologist Joseph Jules François Félix Babinski (1857–1932). The phenomenon itself was described at least as early as 1885 by the Russian-Swiss neuropathologist Constantin von Monakow (1853–1930). Today anosognosia is defined as a failure to recognize the existence of a defect, disability, or disorder involving one's own body. In a restricted sense, the term has a specific bearing on the non-recognition of neurological disabilities due to right hemispheric lesions, such as left-sided hemiparesis, homonymic \*hemianopia, and unilateral \*deafness. This type of anosognosia may be complicated by visuo-spatial neglect, i.e. a lack of awareness of a specific area or side of one's body. The neurophysiological correlates of

this type of anosognosia are not fully known. There is, however, general consensus on the involvement of the right parietal lobe. It has been suggested that the involvement of other CNS structures may be required for the mediation of anosognosia as well, including the right optic thalamus or the right thalamoparietal radiation. The term anosognosia is also used in a wider sense to include phenomena such as denial of \*blindness (as in the \*Anton–Babinski syndrome), denial of illness in Huntington's disease or \*psychotic disorder, and psychological denial of trauma. In all types of anosognosia, confabulations and hallucinatory experiences may be invoked to explain away the problem. In addition, it has been suggested that anosognosia in hemiplegic individuals may be due to \*proprioceptive or \*kinaesthetic hallucinations experienced in the affected body region, which are interpreted either as 'proof' of actual function or as 'proof' of another person being present at the affected side. Two examples of the latter syndrome are known under the names \*altruistic hallucination and \*somatoparaphrenia.

### References

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### Anosognosia for Blindness

see Anton–Babinski syndrome.

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### Anthelic Arc

The term anthelic arc is indebted to the Greek words *anti* (against, opposite to) and *helios* (Sun). It translates loosely as 'arc located opposite to



the Sun'. The term is used in meteorology and physics to denote a collection of rare \*physical illusions taking the shape of a huge, thin \*halo that can be seen against the part of the sky facing the Sun (i.e. the antisolar point). Anthelic arcs can be observed both in the presence and in the absence of \*antheia. They are generally classified as atmospheric effects resulting from the interaction of sunlight and ice crystals with a particular orientation high in the atmosphere.

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- Lynch, D.K., Schwartz, P. (1979). Origin of the antheion. *Journal of the Optical Society of America*, 69, 383–386.
- Lynch, D.K., Livingston, W. (1995). *Color and light in nature*. Cambridge: Cambridge University Press.

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## Anthelion

The term antheion comes from the Greek words *anti* (against, opposite to) and *helios* (Sun). It translates loosely as counter-Sun. The term is used in meteorology and astronomy to denote a rare \*physical illusion consisting of a diffuse, achromatic patch of light manifesting itself at the antheion point, i.e. the spot on the horizon opposite the Sun, and at the same altitude as the Sun. It has been suggested that antheia arise from the intersecting or overlapping of \*antheic arcs and/or related \*halos, such as the parhelic circle, diffuse \*antheic arcs, and Tricker's and Wegener's antheic arcs. But since they also occur in the absence of these halos, it has been suggested that the antheion may deserve to be classified as a separate type of halo. As to the mediation of antheia, various hypotheses exist. These revolve around the notion of ice crystals or ice prisms with a particular orientation present in cirrus clouds and the reflection of sunlight from either the inner or the outer surfaces of these crystals. In the past the term antheion was used in a broader sense to denote a variety of physical illusions occurring at the side of the sky facing the Sun. Thus the French astronomer and author Nicolas Camille Flammarion (1842–1925) includes under the heading antheia such phenomena as the \*Brocken spectre and the \*Ulloa circle.

### References

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## Anthypnic Sensation

see Hypnagogic hallucination.

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## Antibiotics and Hallucinations

The term antibiotic comes from the Greek words *anti* (against) and *bios* (life). It is used to denote a group of chemotherapeutic agents with varying chemical structures, which have the capacity to inhibit or abolish the growth of microorganisms such as bacteria, fungi, and/or protozoa. Among the many adverse effects that may occur during treatment with antibiotics are psychiatric symptoms and symptom complexes such as anxiety, depression, mania, catatonia, and acute \*psychosis. Antibiotic-induced hallucinations tend to be of a \*visual and/or \*auditory nature. The pathophysiologic mechanisms underlying these hallucinations are little known. In all likelihood, they are not univocal. The study of such mechanisms tends to be complicated by confounding factors such as the simultaneous presence of infectious disease, often complicated by fever, the application of polypharmacy, and the conceptual and clinical overlap of hallucinatory states with \*delirium. Acute psychotic states following the intravenous administration of penicillin are referred to as penicillin psychosis or \*Hoigné syndrome.

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### Anticholinergic Hallucinogen

A term that is sometimes used as a synonym for true hallucinogen and \*deliriant. Within the group of biologically active alkaloids, for example, various substances are classified as anticholinergic hallucinogens.

#### Reference

Roberts, M.F., Wink, M. (1998). *Alkaloids. Biochemistry, ecology, and medicinal applications*. New York, NY: Plenum Press.

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### Antidepressants and Hallucinations

The term antidepressant was introduced in or shortly before 1953 by the American psychiatrists Harry M. Salzer (b. 1906) and Max L. Lurie (b. 1920) in a barely noticed article on the mood-altering potential of the tuberculostatic isoniazid. As the French psychiatrists Jean Delay (1907–1987) and Jean-François Buisson had noted a year before Salzer and Lurie, isoniazid appeared to be well suited to treat anxiety and depressive symptoms. Today the term antidepressant is used in a broad as well as a more restricted sense. In the restricted sense, it denotes a group of psychotropic substances with varying chemical structures which are used in the treatment of an array of psychiatric and neurological symptoms and disorders, including depression, depressive disorder, dysthymia, bipolar disorder, obsessive-compulsive disorder, anxiety, anxiety disorders, eating disorders, chronic pain, and \*hyperaesthesia. In a broader sense, the term antidepressant has been used to designate other compounds and methods with the potential to alleviate a clinically depressed mood, some of which have been used since ancient times. In this broad sense, antidepressants include various nutrients, various herbal and plant preparations (notably opium, phencyclidine, and Saint John's wort), electric convulsive therapy (ECT), light therapy (LT), transcranial magnetic stimulation (TMS), acupuncture, \*sleep deprivation, and psychotherapy. The exact mechanism of action of antidepressant substances is unknown.

Although traditionally a major part of their action is attributed to their influence upon the serotonergic system of the CNS, they are also known to affect dopaminergic, cholinergic, and other neurotransmitter systems. Antidepressant substances are notorious for their many possible adverse effects, including the induction of delusions, \*illusions, and hallucinations. Among the hallucinatory phenomena reported by individuals using antidepressant substances are \*hypnagogic and \*hypnopompic hallucinations, \*simple and \*complex visual hallucinations, and \*verbal and \*nonverbal auditory hallucinations (including \*musical hallucinations). The neurophysiological correlates of these hallucinations are likewise unknown. Some hypotheses focus on the direct action of antidepressants upon the perceptual system via the serotonergic and cholinergic systems. Others focus on their indirect effects due to the release of serotonin-mediated dopamine (suggesting an analogy with the purported mechanism underlying hallucinations in the major psychotic disorders), the suppression of REM sleep (suggesting an involvement of the brain's sleep–dream system), and blurred vision (suggesting a mechanism similar to that underlying the \*Charles Bonnet syndrome).

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### Anti-hallucinatory System

The expression *système anti-hallucinoire* was introduced in or shortly before 1973 by the French psychiatrist Henri Ey (1900–1977) to denote the morphological and functional organizations of the brain and mind, which he envisaged along the lines of the British neurologists John Hughlings Jackson (1835–1911) and Charles Scott Sherrington (1857–1952), and to which he attributed an active protective influence against the interference of hallucinatory percepts. As Ey maintains, “It is due to its constitution and

its equilibrium that consciousness is so organized that it can defend the ego's system in conformity with reality, as well as with its [own] idealistic values, against hallucinatory entropy."

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## Ant Ingestion and Hallucinations

The ceremonial ingestion of ants for the purpose of obtaining \*visions and other hallucinatory phenomena was reported in 1917 by the American anthropologist John Peabody Harrington (1884–1961) while doing fieldwork among the Kutanemuk Indians in Southern California. A similar practice was reported in the context of vision quests by other Indian peoples of South-Central California. Because of their alleged psychoactive properties, such ants are referred to as \*psychoactive fauna. Judging by the practices described in the literature, however, it is not at all certain that the ingestion of ants – which used to be part of various elaborate rituals – is itself responsible for mediating the ensuing hallucinations. Most studies were confounded by the simultaneous employment of techniques such as fasting, \*sleep deprivation, and the use of *Datura* or other psychotropic substances. Another reason for doubt stems from the biochemical research carried out on ants. It has been speculated that the ants used in vision quests may have belonged to the yellow honey ant or other species of the *Myrmacomecocystus* genus, which do not contain any known psychoactive substances. Hallucinations associated with the ingestion of ants should not be confused with hallucinations depicting ants and other insects, which are known under the name \*formicative hallucinations. A person intentionally employing ant ingestion for the purpose of exploring the psyche may be called a \*psychonaut.

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## Antipsychotics and Hallucinations

The term antipsychotic is used as a synonym for the terms neuroleptic and major tranquilizer. All three terms refer to a group of psychotropic substances with varying chemical structures that have a broad range of effects upon the CNS, the peripheral nervous system, and various other tracts. Among these effects is the potential to suppress the mediation of hallucinations and other \*psychotic symptoms. The coiner of the term antipsychotic is unknown but it must have been intended to draw exclusive attention to the antipsychotic potential of these substances, thus suggesting a specificity of their action that was not warranted by their actual range of effects. The history of the antipsychotics starts with the alkaloid reserpine, a compound of the snakeroot plant *Rauwolfia serpentina*, which in Ayurvedic medicine has been used to treat 'madness' since ancient times, and the synthesis of chlorpromazine by the French chemist Paul Charpentier in 1950. The usefulness of chlorpromazine in the treatment of hallucinations and other symptoms characteristic of shock and post-operative \*delirium was recognized in 1951 by the French surgeon Henri Laborit (1914–1995). The term neuroleptic was introduced in 1955 by the French psychiatrists Jean Delay (1907–1987) and Pierre Deniker (b. 1917), who were the first to test the efficacy and safety of chlorpromazine in individuals with a clinical diagnosis of \*schizophrenia. In 1957, Delay and Deniker published a proposal for the biochemical action of chlorpromazine. A subsequent publication by the Swedish pharmacologists Arvid Carlsson (b. 1923) et al. in 1963, which designated the antipsychotics primarily as antidopaminergic agents, is generally regarded as an empirical corroboration of Delay and Deniker's biochemical thesis. In addition to their effects on the dopaminergic system, however, the antipsychotic substances also affect a variety of other neurotransmitter systems in the CNS. For example, they also have anticholinergic, antihistaminergic, and serotonergic effects, as well as an antagonistic effect on adrenergic receptors. On the basis of the antidopaminergic effects of chlorpromazine and

other antipsychotics, in 1974 the group headed by the American psychiatrist and pharmacologist Solomon Snyder (b. 1938) proposed their \*dopamine hypothesis of schizophrenia. Thus 3-hydroxytyramine or dopamine became a likely – although certainly not the only – candidate for biochemical models of hallucinatory experience in general. In spite of the high degree of sophistication that characterizes models like these, it should be noted that the elucidation of the neurophysiological correlates of hallucinatory experience and treatment is far from complete. The antipsychotics have been classified in various ways. Using their relative effect upon psychotic symptoms as a guiding principle, they are divided into low-potency and high-potency antipsychotics. In accordance with their molecular characteristics, they are divided into classical and atypical antipsychotics. The term classical antipsychotic has traditionally been used to denote the phenothiazine, thioxanthene, butyrophenone, and diphenylbutylamine groups of antipsychotics, as well as the substance tiapride – all of which are believed to have the dopaminergic D2 receptor as their major site of action. The term atypical antipsychotic is used to denote substances such as aripiprazole, clozapine, olanzapine, risperidone, sulpiride, quetiapine, and sertindole. The purported site of action of these substances is different for each substance, affecting one or more of the neurotransmitter systems listed above. The effects of antipsychotic substances upon hallucinations and other psychotic symptoms tend to differ somewhat across the various disease categories and across individuals within those categories. In the case of hallucinations due to any type of organic pathology, remission depends at least partly on an adequate treatment of the underlying disorder. Generally speaking, hallucinations occurring in the context of delirium or substance abuse tend to abate more quickly than those occurring in the context of any of the major psychotic disorders. Moreover, acute psychotic symptoms tend to diminish step by step. Symptoms such as sleeplessness, agitation, and aggression generally diminish within several days after the onset of antipsychotic treatment. The frequency and severity of hallucinations tend to diminish after 4–6 weeks of treatment. It has been suggested that the decline in hallucinatory behaviour often seen during the first few days of treatment is a sign that genuine antipsychotic effects kick in within hours after the onset of antipsychotic treatment. How-

ever, most authors attribute this initial effect to sedation and/or other aspecific therapeutic factors. In individuals with a major psychotic disorder, hallucinations – as well as delusions, formal thought disorders, catatonic symptoms, and negative symptoms – can disappear within several weeks to months. In many individuals with a clinical diagnosis of schizophrenia, however, these symptoms tend to linger on, although they often become less severe and incapacitating. Roughly speaking, a quarter to one-third of all individuals with a clinical diagnosis of schizophrenia attain a state comparable to complete remission. One-third to one-half of sufferers experience lifelong episodes of relapse and remission, generally with ongoing, though less severe psychotic symptoms during the periods of remission. The last quarter of the group remains psychotic throughout. This state of affairs was noted by the Swiss psychiatrist Eugen Bleuler (1857–1939) a century ago. And in spite of the advent of antipsychotic drug treatment, it has remained essentially unaltered up until the present day. It has even been argued that the surplus value of antipsychotic drug treatment is not its influence upon the long-term course of any of the major psychotic disorders, but rather its capacity to limit the duration of psychotic episodes and to reduce the severity of hallucinations and other psychotic symptoms. As is the case with any therapeutic, the antipsychotics tend to induce adverse effects. These include sedation, orthostatic hypotension, obstipation, urinary retention, changes in the electrocardiogram (ECG), hypersalivation, parkinsonism and other extrapyramidal symptoms, akathisia, metabolic syndrome, hyperprolactinaemia, disturbances of sexual function, agranulocytosis, a lowering of the threshold for epileptic seizures, tardive dyskinesia, and malignant neuroleptic syndrome. Alternative and/or adjuvant treatment forms for hallucinations include the use of lithium or other mood-stabilizing agents, psychotherapy, electroconvulsive therapy (ECT), and transcranial magnetic stimulation (TMS). In the past, many other alternatives have been explored, including sedation with the aid of substances such as chloral hydrate, paraldehyde, and acetylcholine, alongside insulin coma treatment, drug-induced convulsive therapy, hydrotherapy, and psychosurgery. Conceptually, the term antipsychotic is used in opposition to the term \*psychotic (which is employed as an equivalent of the term \*hallucinogen to denote a group of substances with hallucinogenic properties).

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term transient Anton's syndrome is used for temporary cases of denial of blindness. A condition reminiscent of the Anton–Babinski syndrome, in which individuals with eyeball enucleations are temporarily under the impression that they can see with their absent eye, is known as \*phantom vision.

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## Anton–Babinski Syndrome

Also known as Anton's syndrome, Anton's symptom, Anton's blindness, anosognosia for blindness, denial of blindness, and visual anosognosia. The eponym Anton–Babinski syndrome refers to the Austrian psychiatrist and neurologist Gabriel Anton (1858–1933) and the Polish-French neurologist Joseph Jules François Félix Babinski (1857–1932). It is used to denote a subtype of \*anosognosia first described by Anton in 1899, characterized by a denial of \*blindness in individuals with partial or total blindness. Individuals suffering from the Anton–Babinski syndrome typically act as if they can see. They tend to confabulate about their environment and about the reason why they have difficulty in handling objects, collide with pieces of furniture, bump into walls, and experience difficulty in finding their way around. Originally described in individuals with bilateral lesions of the occipital cortex, the eponym Anton–Babinski syndrome also applies to the denial of the condition in individuals with other types of blindness. Incidentally, it has been described in individuals with \*hemianopia as well. The mediation of the Anton–Babinski syndrome is attributed to a combination of partial or total blindness, anosognosia, imaginary visual experiences, and \*visual hallucinations. It has been suggested that the syndrome's neurophysiological substrate may be similar to that of other types of anosognosia. The

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## Anton's Blindness

see Anton–Babinski syndrome.

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## Anton's Symptom

see Anton–Babinski syndrome.

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## Anton's Syndrome

see Anton–Babinski syndrome.

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## Anwesenheit

see Sensed presence.

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## Apophany

see Apophenia.

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## Apophenia

Also known as apophany. Etymologically, both terms appear to stem from the Greek words

*apo* (away from, apart) and *phainein* (to show, to make appear). It has been suggested, however, that apophenia results from a misspelling and that the proper term should be apophrenia, from the Greek words *apo* (away from) and *phren* (nerve, mind). Historically, the terms apophenia and apophany derive from the German neologism *Apophänie*, which was introduced in or shortly before 1958 by the German neurologist and psychiatrist Klaus Conrad (1905–1961) to denote an “unmotivated seeing of connections” accompanied by a “specific experience of an abnormal meaningfulness”. Conrad uses the notion of apophenia in the context of a three-stage developmental model of \*schizophrenia (consisting of *trema*, *apophany*, and *apocalypse*). As used in the conradian sense, and applied to the group of \*sensory deceptions, it has been suggested that apophenia may be the neuropsychological substrate of \*pareidolia, \*auditory pareidolia, the \**Dark Side of the Rainbow*, and other \*cognitive illusions. Today the term apophenia tends to be used in a much looser sense, not necessarily relating to psychiatric disease or to perception, to denote an excess of perceptual or heuristic sensitivity leading to the discernment of patterns or connections in random or otherwise meaningless data.

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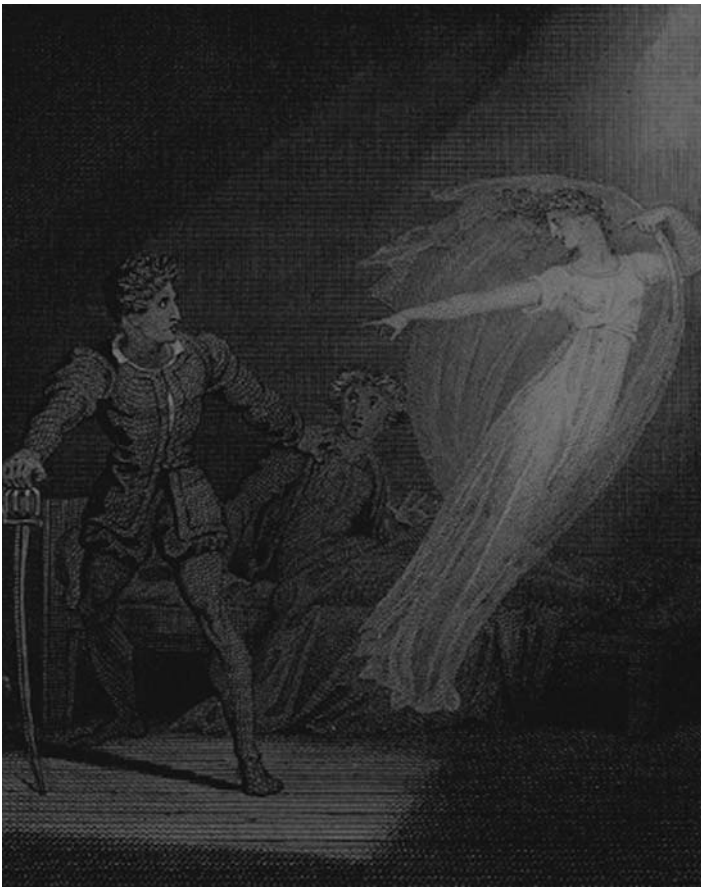
## Apparition

Also known as apparitional experience. Both terms stem from the Latin verb *apparere*, which means to appear or to manifest (itself). The term apparition has various connotations, the most important of which are (1) a \*visual illusion or hallucination, (2) the perceived manifestation of a living person or animal normally outside the range of regular sense perception, and (3) the perceived manifestation of a dead person or animal (traditionally regarded as a ghost or spirit). The common descent of these three sets of connotations is apparent in the 19th century liter-

ature, notably in the *Essay towards a theory of apparitions* by the British physician John Ferriar (1761–1815). Ferriar’s *Essay* has been heralded as the first text that examines hallucinations from a purely physiological point of view. Although it is true that in this work Ferriar seeks to clarify \*visual hallucinations by exclusive reference to natural principles, he still focuses on stories of ghosts and spirits. Parapsychologists tend to distinguish various types of apparitions. An example of a four-factor model, used by the British mathematician and parapsychologist George Nugent Merle Tyrrell (1897–1952), comprises (1) experimental cases (in which an agent deliberately makes itself visible), (2) crisis cases or crisis apparitions (consisting of apparitions coinciding with a crisis experienced by a person connected with those apparitions), (3) post-mortem cases (appearing long after the individual in question has died), and (4) ghosts (i.e. apparitions which habitually haunt certain places). An example of a seven-factor model is provided by the American paranormal researcher Rosemary Ellen Guily. Her model comprises (1) crisis apparitions (i.e. occurring in times of crisis, often of a warning nature), (2) apparitions of the dead (i.e. depicting dead or dying people), (3) collective apparitions (i.e. focussing on various individuals simultaneously), (4) reciprocal apparitions (i.e. where the affected individual has the impression of communicating with a dead or living agent), (5) \*veridical apparitions (which can allegedly be corroborated empirically), (6) deathbed apparitions (also referred to as \*take-away apparitions, to denote the beings that may figure in \*deathbed visions and are believed to summon or escort the dying person from this world into the afterlife), and (7) apparitions suggestive of reincarnation. Apparitions have been reported and recorded since ancient times. Characteristics attributed to them in a greater or lesser degree include their non-physical nature, their possible appearance in \*collective percipiency, and a remarkable tendency to imitate regular sensory percepts (mostly consisting of individuals wearing clothes, but also of animals such as horses, cats, or dogs). Moreover, many apparitions are reportedly preceded by a feeling of \*sensed presence and accompanied by a feeling of cold. As to their spatial characteristics, it is assumed that apparitions can appear either in physical, extracorporeal space (although many parapsychologists hold that they never bind to physical objects) or in a special space of their own (such as a polished surface, a

part of the wall, a mirror, a crystal, or a dream). A third possibility described in the paranormal literature is that the percipient is 'drawn into' the apparition's surroundings and therefore perceives it in its 'natural habitat'. The first large-scale study devoted to apparitions was carried out by the British founders of the Society for Psychical Research (SPR) Edmund Gurney (1847–1888), Frederic Myers (1843–1901), and Frank Podmore (1856–1910), who collected 5,700 first-hand descriptions of apparitions and published these in their 1886 *Phantasms of the living*. The first systematic study of apparitions in the general population was the late 19th century \*Census of Hallucinations, in which 27,329 individuals were

polled in Great Britain, Germany, France, and the United States. Explanatory models pertaining to the nature and origin of apparitions vary widely. Biomedical models tend to use the terms \*complex visual hallucination, \*compound hallucination, or \*personification to denote these phenomena, explaining their mediation by reference to aberrant neurophysiological activity in cerebral areas such as the parietal cortex, the hippocampus, the pedunculus cerebri, and/or the temporo-parieto-occipital junction. Parapsychological models tend to combine such biomedical explanations with hypotheses related to a metaphysical origin of the perceived apparitions. Gurney, for example, conjectured that appari-



**Fig. 6** The Monastery. Engraving (1821) by Charles Heath. Published by Hurst, Robinson, & Co., London

tions could be caused by the telepathic powers of dead or living agents, while Myers speculated that Man's 'subliminal self' might be receptive to extrasensory input stimuli. To suspend judgement on the issue of whether apparitions exist or not, it has been proposed to use the neutral term \*idionecrophany to denote any sensory experience that involves an alleged contact with the dead. As noted by the British historian of psychiatry German Berrios, the notion of the apparition can be regarded as a conceptual precursor of the notion of hallucination. This is perhaps exemplified most clearly by the book *Ueber die Phantastischen Gesichterscheinungen*, published in 1826 by the German physiologist and zoologist Johannes Peter Müller (1801–1858).

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## Apparitional Experience

see Apparition.

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## Apperceptive Hallucination

Also known as hallucination of apperception. The term apperception comes from the Latin verb *percipere*, which means to perceive through and through. It translates loosely as 'conscious perception' and was introduced by the German rationalist philosopher Gottfried Wilhelm Leibniz (1646–1716). During the era of classic psychiatry, the term apperception was used to denote the process by which sense impressions or ideas

are assimilated with the individual's pre-existing body of cognitions and emotions. In the classical psychiatric literature, the term apperceptive hallucination has been used as a synonym for both \*reflex hallucination and \*pseudohallucination.

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## Apperceptive Mindblindness

The German expression *apperceptive Seelenblindheit* was coined in or shortly before 1890 by the German neurologist Heinrich Lissauer (1861–1891) to denote the inability to integrate various elements of visual perception into a single coherent whole or percept. Lissauer contrasted the notion of apperceptive mindblindness with \*associative mindblindness, which he envisaged as the inability to integrate a visual percept with information from the other sensory modalities, a condition which he believed led to a failure of prelinguistic object representation. Both conditions are classified as variants of \*mindblindness or visual agnosia.

### Reference

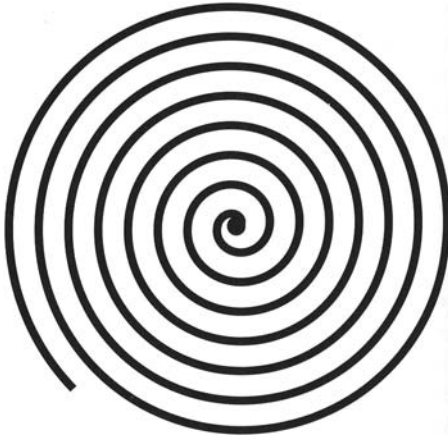
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## Archimedes' Spiral

Also known as Plateau's spiral. The eponym Archimedes' spiral refers to the Greek mathematician and physicist Archimedes of Syracuse (297–212 BC). The eponym Plateau's spiral refers to the Belgian physicist Joseph Plateau (1801–1883). Both eponyms are used to denote a device that induces a specific type of \*motion aftereffect (MAE), called a \*spiral motion aftereffect or spiral MAE for short. Thus the terms Plateau's spiral and Archimedes' spiral refer to a rotating spiral that can be used to induce an illusory sense of expansion or contraction in stationary objects. After viewing the spiral for several minutes and then shifting one's gaze to a stationary object





**Fig. 7** Archimedes' spiral. Source: Plateau, J.A.F. (1878). *Bibliographie analytique des principaux phénomènes subjectifs de la vision, depuis le temps anciens jusqu'à la fin du XVIII<sup>e</sup> siècle, suivie d'une bibliographie simple pour la partie écoulée du siècle actuel*. Mémoires de l'Académie Royale des Sciences, des Lettres et des Beaux-arts de Belgique, Volume 52

(such as a face), the object at hand will appear to expand or contract, depending on the direction of the spiral's rotational movement. The use of Archimedes' spiral played a key role in many of the 19th century studies of MAEs. From the 1960s onwards, it has been used by neurophysiologists and neuropsychologists to detect neural processes involved in motion detection. As with other MAEs, the mediation of spiral MAEs has been associated with the process of adaptation, whereby single cells or cell columns within the visual cortex are adapted to the type of movement involved. The spiral MAE has been classified as a special variant of the \*waterfall illusion. Spiral MAEs are commonly classified as \*physiological illusions. Plateau suffered from blindness due to uveitis and had been blind for 7 years when his paper on the rotating spiral was published.

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### Aretaeus of Cappadocia (c. 150 AD)

A classical physician of the pneumatic school who has been credited with making an early conceptual distinction between \*illusions and hallucinations. Thus Aretaeus's work would seem to have foreshadowed the distinction between illusions and hallucinations that was made in 1832 by the French alienist Jean-Etienne Dominique Esquirol (1772–1840). Aretaeus has also been credited with providing the first description of the \*rainbow spectrum, an extremely rare \*bilateral spectrum occurring in the context of \*migraine aura.

#### Reference

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### Arieti's Definition of Hallucinations

In 1974 the Italian-American psychiatrist Silvano Arieti (1914–1981) defined hallucinations as follows: "Hallucination is an apparent perception of an external object when no such object is present. The stimulus that elicits the seeming perception is an internal one; that is, it comes from within the individual himself. Inasmuch as what is perceived in the hallucinatory experience purports to portray or mirror an aspect of external reality, the perception is false."

#### Reference

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**Fig. 8** Silvano Arieti. Photograph by Blackstone-Shelburne, NY



**Fig. 9** Aristotle's illusion. Source: *La Nature*, 1881, 1, 384

### Aristotle's Illusion

The eponym Aristotle's illusion refers to the Greek philosopher Aristotle (384–322 BC), who appears to have been the first to describe the concomitant phenomenon in his books *On dreams*, *Metaphysics*, and *Problems*. The expression Aristotle's illusion is used to denote a tactile \*illusion or \*body schema illusion that occurs when a test person holds an object between the crossed index and middle fingers, in the absence of visual feedback, and tries to determine the number of objects thus held. Due to the perceptual system's inability to recognize the relative positions of the fingers, the single object tends to be interpreted as two objects. As the French philosopher Maurice Merleau-Ponty (1907–1961) wrote, "Aristotle's illusion is primarily a disturbance of the body image. What makes the synthesis of the two tactile perceptions in one single object impossible, is not so much that the position of the fingers is unaccustomed or statistically rare, it is that the right face of the middle finger and the left face of the index cannot combine in a joint exploration of the object." Aristotle's illusion is commonly



**Fig. 10** Aristotle. Portrait (c. 1475) by Joos van Gent. Source: Musée du Louvre, Paris

classified as a \*physiological illusion. Incidentally, not all the illusions described by Aristotle have been named after him. Two other illusions which he described have become known as the \*Oppel–Kundt illusion and the river illusion (now generally referred to as the \*waterfall illusion).

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### Arrowhead Illusion

see Müller–Lyer illusion.

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### Artificial Somnambulism

see Hypnotism and hallucinations.

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### Artificial Spectrum Top

see Benham's top.

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### Asaad's Definition of Hallucinations

In 1990 the American psychiatrist Ghazi Asaad defined hallucinations as follows: "*Hallucinations* are generally defined as perceptions that occur in the absence of corresponding external stimuli. [...] True hallucinations are experienced and accepted by the patient as real perceptions. It is obvious that reality testing must be impaired in order for this symptom to appear."

### Reference

- Asaad, G. (1990). *Hallucinations in clinical psychiatry. A guide for mental health professionals*. New York, NY: Brunner/Mazel.

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### Asaad's Definition of Illusions

In 1990 the American psychiatrist Ghazi Asaad defined illusions as follows: "*Illusions* are defined as false sensory perceptions of real external stimuli that may be misinterpreted and perceived in a distorted way."

### Reference

- Asaad, G. (1990). *Hallucinations in clinical psychiatry. A guide for mental health professionals*. New York, NY: Brunner/Mazel.

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### Aschematia

The term aschematia comes from the Greek words *an* (not) and *schèma* (form, scheme, or topographic map). It translates roughly as an 'inadequate mapping of space'. The term *aschématie* was introduced in or shortly before 1905 by the French neurologist Pierre Bonnier (1861–1918) as an umbrella term for a group of symptoms characterized by an inadequate representation of the space occupied by some part of the body. As Bonnier wrote, "It is the affliction due to which certain parts of ourselves cease to fit in with the notion that we have of our body. When taking up too much space, there is *hyperschematia*; too little, *hyposchematia*; or a place that is not appropriate, *paraschematia*." Bonnier proposed the term aschematia as an alternative for the older terms *malfunctioning of the somatopsyché* and *\*coenesthesiopathy*. All three terms have been used to denote an alteration of bodily object representations due to a lesion to the right parietal lobe. Due to their subjective nature, *\*hyperschematia*, *\*hyposchematia*, and *\*paraschematia* cannot be observed directly in an affected individual. Therefore, diagnostic procedures tend to rely on the indirect evidence provided by the affected individual's drawings. In these drawings, the left side of a clock appears bloated, for example, and the petals on the left side of a daisy tend to be drawn larger, as well as greater in number than on the right side. Aschematia is considered a productive and subconscious manifestation of neglect. It may be accompanied by *\*negative autoscopia*. Aschematia is usually classified as a variant of the *\*body schema illusions*.

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**Asclepiades of Bythinia (124–c. 40 BC)**

A classical physician and rhetorician from Prusa, Asia Minor, to whom the conceptual distinction between hallucinations and delusions has been attributed. The ancient Greeks referred to delusions and hallucinations by the single term *phantasia* (or *visum*, in Latin). It has been claimed that Asclepiades was the first to describe two varieties of *phantasia*, one in which the individual perceives an object, but interprets it as something else (i.e. what is known today as a delusion) and another in which the individual perceives an object although there is no object to perceive (i.e. what was designated later by Esquirol as a hallucination). However, it has been disputed whether the distinction put forward by Asclepiades referred to hallucinations and delusions, or perhaps to hallucinations and \*illusions. As Asclepiades's own writings have been lost, this issue may well remain unresolved. A definite solution is further complicated by the ambiguity of the term illusion itself, which is used to refer at once to the misperception of objects or stimuli in the external world and to the misinterpretation of (correctly perceived) objects or stimuli.

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**Asomatognosia**

see Acenesthesia.

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**Asomatoscopy**

see Negative autoscopia.

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**Asphalt Mirage**

see Highway mirage.

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**Assimilation**

The term assimilation comes from the Latin verb *assimilare*, which means to equalize. It was used by the German father of psychology Wilhelm Wundt (1832–1920) to denote the physiological process that enables the mind to fill in any blanks and ambiguities that may exist within the stream of perceptual information. As Wundt remarks, the hearing of spoken words depends in large measure upon our ability to fill in the less articulate parts by reference to familiar words and phrases. In his view, the other sensory modalities depend in equal measure upon the perceptual system's urge to create whole, consistent, and meaningful patterns. Or, as the American philosopher James Gibson (1904–1979) recapitulates this point of view, "The perceptual system *hunts*. It tries to find meaning, to make sense from what little information it can get." As Wundt points out, the process of assimilation may also be held responsible for the mediation of words and phrases out of animal voices, the rustling sound of water, the sound of the wind, and machine noises (i.e. the mediation of \*functional hallucinations). Apparently, the American psychologist and philosopher William James (1842–1910) had a similar phenomenon in mind when he formulated his law of figured consciousness. When blanks or ambiguities within the stream of perceptual information are filled in erroneously, \*illusions may arise. The term \*functional hallucination has traditionally been reserved for actual hallucinations that arise in conjunction with background noises.

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## Assimilative Illusion

Also known as \*passive illusion. The term assimilative illusion is indebted to the Latin verb *assimilare*, which means to equalize. It is used to denote a variant of the group of \*cognitive illusions in which the resulting illusory percept is attributed primarily to the assimilation of properly perceived sensory data with an improper set of cognitions. Assimilative illusions are therefore also designated as \*illusions resting on a false interpretation of perceptual data. A common example of an assimilative illusion is an echoed sound being interpreted as a sound derivative from a second source.

### Reference

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## Associative Mindblindness

A term that was coined in or shortly before 1890 by the German neurologist Heinrich Lissauer (1861–1891) to denote the inability to integrate a visual percept with information from the other sensory modalities, entailing a failure of prelinguistic object representation. Lissauer used the notion of associative mindblindness in opposition to the notion of \*apperceptive mindblindness, which was conceptualized by him as the inability to integrate various visual elements into a single coherent whole or percept. Both conditions are classified as variants of \*mindblindness or visual agnosia.

### Reference

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## Asthenopic Scotoma

The term asthenopic scotoma comes from the Greek words *a* (not), *sthenos* (force), *opsis* (seeing), and *skotos* (darkness). In biomedicine the term asthenopia is used to denote ocular fatigue or discomfort due to strain. The introduction of the term is attributed to the Scottish ophthalmologist William Mackenzie (1791–1868). The term asthenopic scotoma is used to denote a \*scotoma (i.e. an area of loss of vision) characterized by the disappearance of all or part of a visual stimulus, usually occurring after a latency period. Common examples of an asthenopic scotoma are the disappearance of letters while one is reading a book and the disappearance of visually perceived objects, leaving behind a grey mist. Such instances tend to have a duration of several seconds, after which time the objects at hand are suddenly perceived again in a normal manner. Etiologically, asthenopic scotoma is associated primarily with \*migraine aura.

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## Astral Projection

see Out-of-body experience (OBE or OBEE).

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## Ataques de Locura

see *Locura*.

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### Athenodorus Cananites

(c. 74 BC–7 AD). A Greek Stoic philosopher who is known, among other things, for his autoreports of complex \*visual and \*auditory hallucinations. According to the Roman natural philosopher Pliny the Younger (62–c. 114 AD), Athenodorus knowingly obtained a house that had stood vacant for sometime because it was believed to be haunted. As Pliny recounts, Athenodorus saw a spectre inside the house, an old man in chains, who guided him towards an inner courtyard. After the man disappeared, Athenodorus purportedly discovered the remains of a chained person buried beneath the spot where the old man had stood. The remains were given a proper burial, and the spectre was seen no more.

#### Reference

Stout, S.E., ed. (1962). *Plinius Epistulae: A critical edition*. Bloomington: Indiana University Press.



**Fig. 11** Belladonna, the goddess of the deadly nightshade. Engraving after a painting by Gabriel Max. Source: *Gartenlaube*, 1902

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### Atopognosis

see Allachaesthesia.

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### *Atropa belladonna* and Hallucinations

*Atropa belladonna* is known under many names, including belladonna, black cherry, devil's cherries, devil's herb, divale, dwale, dwayberry, great morel, mandragora of Theophrastus, naughty man's cherries, and *Solanum lethale*. The name *Atropa* derives from *Atropos*, in Greek mythology the name of one of the Fates who held the shears to cut the thread of human life. The name belladonna comes from the Italian words *bella* (beautiful) and *donna* (lady). It is said to refer to the erstwhile custom whereby Italian women used the substance to dilate their pupils, so as to appear more attractive to men. In an alternative reading, belladonna preparations were thought to promote a fair complexion. The introduction of the name belladonna has been attributed to the Italian herbalist Petrus Andreas Matthiolus (1500–1577). It was the Flemish physician and botanist Charles de l'Écluse, better known as Carolus Clusius (1526–1609), who first used bel-

ladonna as a generic name, while the Swedish physician, botanist, and biologist Carl von Linné or Carolus Linnaeus (1707–1778) added the name *Atropa*. *A. belladonna* is a perennial herbaceous plant of the family Solanaceae or nightshade, which contains the powerful tropane alkaloids atropine, apotropine, hyoscine (i.e. scopolamine), and hyoscyamine. Since ancient times the plant's root, leaves, and berries have been used as an \*entheogen, an aphrodisiac, a therapeutic, an anaesthetic, an analgesic, and a poison, as well as for many other purposes. *A. belladonna* is indigenous to Europe, North Africa, and western Asia. As the ingestion of one leaf of *A. belladonna* can lead to death in an adult, it is considered one of the most toxic plants found in the Western world (hence the generic name *Atropa*). Using the criterion of psychoactive potential as a guiding principle, belladonna is usually classified as a \*deliriant. The symptoms of belladonna intoxication are similar to those of henbane and atropine. They include anticholinergic symptoms such as mydriasis, blurred vision, tachycardia, vertigo, a sense of suffocation, an extremely dry throat, constipation, and urinary retention, as well as \*illusions, hallucinations, the so-called belladonna \*delirium, sopor, and eventually coma and death (usually due to respiratory



**Fig. 12** *Atropa belladonna*. Woodcut. Source: Tabernaemontanus, J.Th. (1687). *Neu Vollkommen Kräuter-Buch*. Basel: Joh. Ludwig König und Johann Brandmyller

paralysis). Pathophysiologically, these symptoms are associated with the inhibition of the action of acetylcholine at the acetylcholine receptor in the nerve synapse, thereby blocking the physiological function of the parasympathetic nervous system. A person intentionally employing belladonna for the purpose of exploring the psyche may be called a \*psychonaut. Belladonna is seldom used as a \*hallucinogen for recreational purposes. It can be smoked, ingested raw, or consumed in the form of a tea. In all cases, belladonna is reputed to mediate vivid \*visual or \*compound hallucinations, sometimes described as a 'living dream', complete with highly realistic scenes and \*personifications. According to the German anthropologist and ethnopharmacologist Christian Rättsch (b. 1957), "Belladonna-induced hallucinations are typically described as threatening, dark, demonic, devil-

ish, hellish, very frightening, and profoundly terrifying. Many users have compared the effects to the effects of a 'Hieronymus Bosch trip' and have indicated that they have no intention of repeating the experiment." The use of belladonna carries a grave risk of an accidental overdose. Moreover, belladonna's lack of popularity as a recreational drug is due primarily to the adverse anticholinergic effects it induces. These tend to commence before the onset of the hallucinations and to continue during the hallucinatory episode. Because belladonna slows the motility of the stomach and gut, the side effects may continue for a long time after the moment of ingestion.

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## *Atropa Mandragora* and Hallucinations

see *Mandragora officinarum* and hallucinations.

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## Atropine and Hallucinations

The name atropine derives from *Atropos*, in Greek mythology the name of one of the Fates who held the shears used to cut the thread of human life. It is a highly potent tropane alkaloid that occurs in many species of the plant family Solanaceae. It is thought that the deadly nightshade *Atropa belladonna* was already known to the Greek father of botany Theophrastus of Eresos (371–286 BC). In 1820 atropine was isolated from the root of this plant by the German apothecary Rudolph Brandes (1795–1842), who also coined the name of the substance. It was synthesized for the first time in 1901 by the German chemist and Nobel Prize laureate Richard Willstätter (1872–1942). In biomedicine atropine is used for a variety of purposes, including mydria-

sis, bronchodilatation, spasmodic, and the treatment of arrhythmias and coronary disease. Using the criterion of psychoactive potential as a guiding principle, atropine is usually classified as a \*deliriant. Its principle mechanism of action is thought to be the inhibition of the action of acetylcholine at the acetylcholine receptor in the nerve synapse, thereby blocking the physiological function of the parasympathetic nervous system. This may lead to anticholinergic effects such as mydriasis, a dry mouth, urinary retention, obstipation, and an inhibition of sweat secretion. Atropine intoxication can entail tachycardia, ventricular fibrillation, vertigo, nausea, blurred vision, photophobia, confusion, hallucinations, motor excitation, \*delirium, coma, and eventually death. The hallucinations mediated by atropine intoxication tend to be \*visual or \*compound in nature. Although they have been mentioned in the literature since ancient times, they have seldom been described in detail. A case report by the American neurologist C. Miller Fisher (b. 1910) records visual hallucinations prompted by the intravenous administration of atropine in a 74-year-old male, in the absence of any other psychiatric or neurological symptoms. Fischer describes the phenomenological qualities of these hallucinations as follows: "1) The hallucinations were purely visual i.e. there was no sound or other modality; 2) they were ever present, constantly changing, panoramic, vivid, realistic, of natural size, in normal perspective at appropriate distances in space, stationary or moving from left to right, seemed to involve the visual fields symmetrically and were not brightly colored; 3) the images were described as much more vivid than visual images in a dream but not as bright as normal waking vision; 4) the hallucinations were always complex and there were no elementary scintillations, lights, sparkles or stars; 5) the multiplicity of similar images (letters A, landscapes, footballers and soldiers) a phenomenon known as multiplication was noteworthy; 6) the images appeared instantaneously on closing the eyes and disappeared equally promptly on opening the eyes; 7) faces were not a feature of the hallucinations whereas the patient later reported that in his normal hypnagogic experiences faces were prominent; 8) the hallucinations of the first few days were highly organized and complex while in later days they were much less elaborate, fragments of wire or 'dirt' being among the last phenomena; 9) the hallucinations gradually decreased and ceased about day 11 at approximately the same time as

dryness of the mouth was relieved; 10) the torrent of variegated hallucinations succeeding one another several times a minute was distinctive and represents an addition to recorded neuropsychological experience." On the basis of the hypnagogic element described here, Fisher speculates that in this case the visual hallucinations may have been mediated by the brain's sleep-dream system. In general, hallucinations due to atropine intoxication can last for days to weeks after the intoxication took place. Because of its hallucinogenic properties, atropine has occasionally been used as a recreational drug. However, due to the risk of an accidental overdose, this is highly dangerous and, in view of the anticholinergic adverse effects, tends to be a rather unpleasant experience. A person intentionally employing atropine for the purpose of exploring the psyche may be called a \*psychonaut.

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#### Atypical Odontalgia

see Phantom tooth pain.

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#### Aubanel's Definition of Hallucinations

In 1839 the French physician Honoré Aubanel defined hallucinations as follows: "The hallucination is a form or variety of mental illness in which a person transforms delirious mental ideas into sensations, or, using these same ideas, perverts his real sensations by assimilating them with the ideas of his delirium."

#### Reference

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## Audible Thinking

see *Gedankenlautwerden*.

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## Audio Illusion

see Musical illusion.

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## Audioalgesic Hallucination

Also known as audioalgesic synaesthesia. Both terms are indebted to the Latin verb *audire* (to hear) and the Greek noun *algos* (pain). They were introduced in or shortly before 1979 by the American neurologists Daniel Enrique Jacome and Robert Jerome Gumnit to denote a \*compound hallucination comprising an auditory component and a pain component.

### Reference

Jacome, D.E., Gumnit, R.J. (1979). Audioalgesic and audiovisuoalgesic synesthesias: Epileptic manifestation. *Neurology*, 29, 1050–1053.

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## Audioalgesic Synaesthesia

see Audioalgesic hallucination.

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## Audiosensitivity

The term audiosensitivity comes from the Latin words *audire* (to hear) and *sensitivus* (sensitive). It is used to denote a variant of \*hyperacusis in which intense sounds are experienced as louder than normal. This typically entails an aversion to the output of electronic devices such as radios, sound systems, and television sets. Although the exact mechanism underlying audiosensitivity is unknown, the condition is associated primarily with mechanical disorders of the middle or inner ear.

### Reference

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## Audiovisuoalgesic Hallucination

Also known as audiovisuoalgesic synaesthesia. Both terms are indebted to the Latin words *audire* (to hear) and *visio* (sight) and to the Greek noun *algos* (pain). They were introduced in or shortly before 1979 by the American neurologists Daniel Enrique Jacome and Robert Jerome Gumnit to denote a \*compound hallucination comprising an auditory component, a visual component, and a pain component. The subject described in Jacome and Gumnit's paper experienced audiovisuoalgesic hallucinations in the context of \*aurae preceding epileptic seizures, characterized by a sudden onset of pain in the region of the right trigeminal nerve, the simultaneous auditory perception of the word "Five" in both ears, and the visual perception of the number 5 against a grey background before both eyes.

### Reference

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## Audiovisuoalgesic Synaesthesia

see Audiovisuoalgesic hallucination.

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## Audition Colorée

A French expression for the term \*colour hearing.

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## Auditory Aura

A term used to denote a type of \*aura that manifests itself in the form of isolated \*auditory hallucinations or \*illusions. When an auditory hallucination or illusion occurs in conjunction with hallucinations in other sensory modalities, or with alterations in the sense of familiarity, it may – under certain conditions – be designated as a \*psychic aura. Auditory auras occurring in the context of epilepsy have been described since ancient times. One of the first modern descriptions stems from the Swiss physician Samuel Auguste André David Tissot (1728–1797), who

in 1770 mentioned a case of combined \*auditory and \*visual hallucinations occurring in the context of epilepsy, described by an author named Peiroux. Like other types of auditory hallucinations, auditory auras may present in the form of \*verbal or \*nonverbal auditory hallucinations, including \*musical hallucinations. The mediation of auditory auras is associated primarily with focal epileptic seizures affecting the superior temporal gyrus (i.e. with temporal lobe epilepsy) and with migraine.

### References

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### Auditory Autokinetic Effect

see Autokinetic effect.

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### Auditory Charles Bonnet Syndrome

A term used to denote \*musical hallucinations occurring in association with moderate or severe \*hearing loss. By analogy with the pathophysiology of \*Charles Bonnet syndrome in individuals with diminished visual acuity, it has been suggested that this type of musical hallucination may be due to \*deafferentiation.

### Reference

- Evers, S., Ellger, T. (2004). The clinical spectrum of musical hallucinations. *Journal of the Neurological Sciences*, 227, 55–65.

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### Auditory Deafness

A term introduced in or shortly before 1995 by the American psychologists Arien Mack (b. 1931) and Irvin Rock (1922–1995). The term auditory deafness is used to denote a complete failure to consciously perceive an above-threshold auditory stimulus, because of the observer's focus of attention being elsewhere. A typical setting in which auditory deafness can be found to occur is dichotic listening, i.e. a setting where a test person is requested to listen carefully to a certain auditory stimulus and is simultaneously presented with an unexpected and somewhat different auditory stimulus in the unattended ear. The partial unawareness of the presence of such an aberrant auditory stimulus is called \*inattentional deafness. The phenomenon itself has been described in the medico-psychological literature at least since the era of mesmerism. In the 19th century hypnotist tradition, for example, inattentiveness constitutes one of the explanatory models for the mediation of \*negative hallucinations. An analogous phenomenon, occurring in the visual modality, is called \*inattentional blindness. When occurring in the tactile or haptic modality, the term \*tactile insensitivity is used. Yet another related phenomenon is known as \*change blindness. On the basis of psychological and philosophical studies in areas such as these a new brand of scepticism has been developed (see the entry Grand illusion argument).

### References

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### Auditory Hallucination

Also known as acoustic hallucination, aural hallucination, and hallucination of hearing. Auditory hallucinations are the most prevalent type of hallucinations in adults with or without a history of psychiatric illness. It is estimated that the 1-year prevalence of auditory hallucinations in the general, non-institutionalized population lies between 2 and 3%. In schoolchildren the

1-year prevalence of auditory hallucinations has been found to be no less than 9%. The lifetime prevalence of auditory hallucinations in the non-institutionalized population has been reported to be at least 70%. In individuals with a clinical diagnosis of \*dissociative disorder, the lifetime prevalence of auditory hallucinations is estimated at around 85%. In individuals with a clinical diagnosis of \*schizophrenia, this rate is 60–70%. In comparison with the group of non-institutionalized individuals, the latter two groups are characterized by a markedly higher mean frequency of hallucinations, as well as a higher prevalence of negative attribution and/or content. Auditory hallucinations are experienced as coming from inside or outside the head and are therefore referred to as \*internal or \*external auditory hallucinations. External auditory hallucinations can be experienced as coming from a fixed location and/or distance in extracorporeal space, but often their apparent source is indeterminable. The perception of auditory hallucinations tends to be independent of the individual's own location. However, some individuals claim that their auditory hallucinations are sometimes 'left behind' when they move from one spot to another. For example, a voice heard in the kitchen while cooking a meal is later heard as if coming from the kitchen, even after everyone is seated at the table in an adjacent room. The frequency and intensity of auditory hallucinations may vary in accordance with such factors as the increase or decrease in the intensity of background noises, the presence or absence of certain individuals, the presence or absence of psychosocial stresses, the individual's sensorium, and the prior use of therapeutics, alcohol, or other substances. When auditory hallucinations are prompted by a regular sense perception in one of the other sensory modalities, they are referred to as \*synaesthesias. \*Light-phonisms, for example, constitute a subgroup of the synaesthesias characterized by an auditory hallucination prompted by a regular visual percept. When such regular percepts are lacking and auditory hallucinations are described as "being heard by" another body part than the ears (i.e. by the eyes, or the knee, or the stomach), they are referred to as \*extracampine hallucinations. When they occur simultaneously with a hallucination in one or more of the other sensory modalities, they are classified as compound hallucinations. In accordance with varying guiding principles and goals, auditory hallucinations can be divided into various subtypes. Thus the German neurologist

Carl Wernicke (1848–1904) divides auditory hallucinations into \*verbal auditory hallucinations (which he calls \*phonemes) and \*nonverbal auditory hallucinations (or \*akoasms). Verbal auditory hallucinations (VAHs) have also been termed \*auditory verbal hallucinations (AVHs). Pathophysiologically, VAHs are associated with aberrant neurophysiological activity in the left temporal lobe, more specifically, in the gyrus temporalis superior, Heschl's gyrus, the planum temporale, and the speech areas (i.e. Broca's area and Wernicke's area). Functional MRI findings suggest that the right homologue of Broca's area may be involved in the mediation of VAH as well. Moreover, it has been hypothesized that the cortical hallucinatory activity characteristic of VAH may be preceded by subcortical activity, notably from within the limbic system and amygdala. Theoretically, this makes sense if the hallucinations at hand are interpreted as \*reperceptions of previously memorized speech. Neuroimaging findings would seem to suggest that, in some cases at least, alterations of white matter fibre tracts connecting areas relevant to speech perception and/or production may also be responsible for the mediation of VAHs. VAHs occurring simultaneously with subtle instances of motor activity within the larynx and/or the vocal cords are covered by the term \*subvocalization. In the older literature this phenomenon is also referred to as \*motor verbal hallucination, \*psychomotor verbal hallucination, and \*muscular verbal hallucination. VAHs that repeat or echo the subject's conscious thoughts are referred to in the literature as \**Gedankenlautwerden*, thoughts-out-loud, audible thinking, and *écho de la pensée*. When VAHs come in the form of an incentive or command, they are referred to as \*command hallucinations or \*imperative hallucinations. Nonverbal (or \*nonvocal) auditory hallucinations come in many forms. When they appear in the form of music, they are referred to as \*musical hallucinations. Amorphous and often continuous sounds such as buzzing, humming, the sound of running water, or waves upon the shore have traditionally been interpreted as signs of \*tinnitus. However, the more recent literature suggests that there is considerable overlap – conceptually as well as phenomenologically and perhaps also physiologically – between tinnitus and auditory hallucinations. Theoretically, nonverbal auditory hallucinations can be mediated by any part of the auditory system, ranging from the cochlea and acoustic nerve to the primary auditory cor-

tex and association cortex. Where they have a demonstrable relation to structural and/or functional abnormalities in the brainstem, they are referred to as \*brainstem auditory hallucinations. The traditional explanatory models for the mediation of auditory hallucinations include the \*reperception model, the \*perceptual release model, the \*dissociation model, and the \*inner speech model.

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## Auditory Hyperaesthesia

see Hyperacusis.

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## Auditory Illusion

The term auditory illusion is used in a general sense to denote a misrepresentation or misinterpretation of auditory stimuli. Some common examples are words that are misunderstood, \*figments, and nonverbal sounds such as the humming of a ventilator misinterpreted as music. In a more specific sense, the term auditory illusion is used by the Canadian neuroscientists Wilder Graves Penfield (1891–1976) and Sean Francis Mullan (b. 1925) to denote a sound that seems louder or softer, fainter or more distinct, nearer or farther. As used by Penfield and Mullan, auditory illusions are classified as \*psychical illusions, which are in turn classified as \*psychical states (i.e. as \*aurae occurring in the wake of an epileptic seizure or during a cortical probing experiment). In this specific context, the term auditory illusion is used in opposition to the terms \*visual illusion, \*illusion of recognition, \*illusional emotion, and a nameless remaining group containing relatively rare phenomena such as illusions of increased awareness, illusions of alteration in the speed of movement, and visuo-vestibular disturbances. Pathophysiologically, Penfield and Mullan relate auditory illusions to aberrant neuronal discharges in the temporal lobe. However, theoretically auditory illusions can probably be mediated by any part of the auditory pathways, primary auditory cortex, associative cortex, and limbic system. Two special types of auditory illusion are the \*musical illusion and the \*Doppler effect.

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## Auditory Pareidolia

Also known as Rorschach audio and auditory peripheric hallucination. The term auditory pareidolia is indebted to the Greek words *para* (next to, in addition, beside) and *eidōs* (image, appearance, looks). The eponym Rorschach audio refers to the Swiss psychiatrist Hermann

Rorschach (1884–1922), the inventor of the Rorschach inkblot test. Both terms are used to denote a \*cognitive illusion consisting of intelligible and meaningful words discerned in a pattern of unintelligible words, random sounds, or white noise. Auditory pareidolia is classified as a type of \*pareidolia. The notion of pareidolia, at least as originally conceptualized by the Russian psychiatrist Victor Kandinsky (1849–1889), used to have an exclusive bearing on the visual modality. Today pareidolia tends to be attributed to \*apophenia, i.e. an excess of perceptual or heuristic sensitivity leading to the discernment of patterns or connections in random or otherwise meaningless data. As a consequence, the term now encompasses cognitive illusions experienced in any of the sensory modalities. Auditory pareidolia is believed to play an important part in \*backward masking, as well as in the \*electronic voice phenomenon (EVP).

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### Auditory Peripheric Hallucination

see Auditory pareidolia.

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### Auditory Perseveration

see Palinacusis.

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### Auditory Sleep Start

see Exploding head syndrome.

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### Auditory Verbal Hallucination (AVH)

Also known as \*verbal auditory hallucination, voice hallucination, \*phoneme, hallucinated speech, and ‘voices’. The term auditory verbal hallucination (AVH) is often used as a synonym for verbal auditory hallucination (VAH), both terms referring to what are commonly known as ‘voices’. Thus the expressions AVH and VAH refer to the same phenomenon and tend to be used interchangeably. And yet they have a slightly different connotation, due to the conceptual backgrounds from which they stem. By definition, VAHs are primarily auditory in nature and are distinguished from other auditory hallucinations (of a musical or otherwise nonverbal nature) by the specifier *verbal*. The notion of the AVH, on the other hand, refers to a type of hallucination which is primarily verbal in nature and which is distinguished from other verbal hallucinations (such as \*psychomotor verbal hallucinations, which are regarded as inaudible in nature) by means of the adjective *auditory*. This latter distinction, i.e. between auditory verbal hallucinations and psychomotor verbal hallucinations, is based on the work of the French psychiatrist Louis Jules Ernest Ségla (1856–1939). After Ségla’s death in 1939 the notion of the psychomotor hallucination receded into the background of psychiatric conceptual thinking. However, its conceptual opposite, the notion of the auditory verbal hallucination, somehow retained its popularity.

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### Aura

Also known as aural phenomenon and \*psychical state. The term *aura* is Greek for wind, breeze, or smell. Its introduction into medicine has been attributed to the Greek physician Pelops, the master of the great Galen of Pergamum

(129–c. 216 AD). Reportedly, Pelops used the term to denote the phenomena he had often observed preceding attacks of epilepsy (referred to as “the disease called sacred” throughout the Hippocratic Corpus). Being struck by ‘marches’ of involuntary motor movements starting in the foot or hand, and apparently ascending up to the head, Pelops conceptualized the aura as a “cold vapour” affecting the limbs and passing up through the peripheral blood vessels – which the Greeks believed to be filled with air – towards the head. Aurae were studied extensively during the 19th century, notably by the British neurologist John Hughlings Jackson (1835–1911). By then they were no longer conceptualized as being mediated by vapours nor were the blood vessels conceptualized as containing air. But the notion of a peripheral origin of the aura remained largely in place. Jackson’s concept of uncinat epilepsy as the pathophysiological basis of aurae reversed the notion of their peripheral origin. Today the terms aura and aura epileptica are used to denote an ictal manifestation of an epileptic seizure that manifests itself in the form of a sensory (i.e. hallucinatory), psychosensory, and/or experiential symptom. The hallucinatory symptoms are also referred to as \*ictal hallucinations. An aura may occur either in isolation or as a ‘warning symptom’ preceding a paroxysmal neurological event such as an epileptic seizure or a migraine attack. As the German psychiatrist and philosopher Karl Jaspers (1883–1969) wrote, “During [an aura] the outer world disappears; the inner experiences become overpowering, consciousness narrows and in this restricted state it can yet have a moment of high illumination.” Aurae typically last for seconds, or at most minutes. In his writings on uncinat epilepsy, Jackson focused primarily on aurae mediated by the temporo-sphenoidal lobe. It is now known, however, that they can be mediated by the parietal and occipital lobes as well and that they can manifest themselves in any of the sensory modalities. In accordance with the sensory modality involved, they were classified in 1998 by the International League Against Epilepsy (ILAE) as \*somatosensory aura, \*visual aura, \*auditory aura, \*olfactory aura, \*gustatory aura, \*autonomic aura, \*abdominal aura, and \*psychic aura. A rare type of aura that can persist for months or even years without any signs of cerebral infarction is referred to as \*persistent aura without infarction. Historical personages who described their own experience of what have

been retrospectively identified as aurae include Charles Lutwidge Dodgson (better known as Lewis Carroll, 1832–1898), Hildegard of Bingen (1098–1179), and Fyodor Mikhailovich Dostoevsky (1821–1881). Today the term aura is also used by the ILAE as the name of a major category of epileptic seizures, namely those affecting the sensory sphere (see the entry Epilepsy and hallucinations). In parapsychology, the term aura is used somewhat differently, denoting a \*visual halo of subtle, multicoloured, and luminous radiations said to surround human beings and other living creatures.

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### Aura Epileptica

see Epilepsy and hallucinations.

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### Aural Hallucination

see Auditory hallucination.

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### Aural Phenomenon

see Aura.

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## Aureole Effect

see Heiligenschein.

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## Autohallucination

see Heautoscopy.

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## Autokinesis

see Autokinetic effect.

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## Autokinetic Effect

Also referred to as autokinetic sensation, autokinetic illusion, autokinetic phenomenon, autokinesis, and \*Charpentier's illusion. The term autokinetic effect is indebted to the Greek words *automatos* (automatically, driven by a power of its own) and *kinēsis* (movement). It translates loosely as self-movement effect. The adjective autokinetic was introduced in or shortly before 1887 by the German physiologist Hermann Rudolph Aubert (1826–1892). The eponym Charpentier's illusion refers to the French ophthalmologist and physiologist Augustin Charpentier (1852–1916). Although the term Charpentier's illusion is used mainly as an equivalent of the term \*size-weight illusion, in the literature it can also be found as applying to the autokinetic effect. The autokinetic effect consists of the illusory motion of a small object or stimulus against a contrasting, uniform background (i.e. a light spot against a uniformly dark background or a dark spot against a uniformly light background). The illusory motion typically commences after a few seconds of visual fixation. As a phenomenon, the autokinetic effect was probably recorded for the first time in 1799 by the German naturalist and explorer Friedrich Heinrich Alexander Freiherr von Humboldt (1769–1859). Von Humboldt discovered it while observing the stars from a mountain peak in Tenerife and called it *Sternschwanken* ('star swinging'). In the German literature the illusory motion of a black spot against a light background is traditionally called *Punktschwanken* ('dot swinging'). The angular velocity of the illusory move-

ment in question tends to be 2° to 3° per second, and the total movement may cover 30° or more, especially in cases of marked ocular or general fatigue and a constrained eye position. The neurophysiological correlates of the autokinetic effect are not fully understood. Initially *Sternschwanken* was believed to result from the actual, physical movement of the stars and/or the light emanating from them. It was not until the mid-19th century that an author named G. Schweizer had a star observed by different persons simultaneously, and thus discovered that the movement is actually illusory in nature. Ever since, the autokinetic effect has been classified as a \*physiological illusion. It has traditionally been assumed that slow, involuntary movements of the eyeball may play a part in its mediation or that it may constitute an \*aftereffect of postural shift or body movement. The possibility of a central mediation of the autokinetic effect has also been suggested. The latter thesis has been the object of renewed interest in relation to neuroimaging research suggesting the involvement of bilateral activity in the motion-sensitive middle occipito-temporal area known as MT/V5. As the autokinetic effect tends to respond to suggestion, it has of old also been labelled a psychogenic phenomenon (i.e. a \*cognitive illusion). Autokinetic effects have been described in the visual modality (i.e. visual autokinetic effects) and in the auditory modality (i.e. auditory autokinetic effects). The *auditory* autokinetic effect consists of an illusory spatial displacement of sounds, often combined with variations in loudness and pitch. The phenomenon was probably described for the first time in 1957 by the American cognitive psychologists Alfred C. Bernardin and Howard Ernest Gruber (1922–2005). The autokinetic effect should not be confused with \*oscillopsia.

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### Autokinetic Illusion

see Autokinetic effect.

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### Autokinetic Phenomenon

see Autokinetic effect.

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### Autokinetic Sensation

see Autokinetic effect.

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## Automatism

The term *automatisme* was introduced in or shortly before 1846 by the French alienist Jules Gabriel François Baillarger (1806–1891). It comes from the Greek adjective *automatos*, which means automatically or driven by a power of its own. Baillarger used the term automatism to denote a class of hallucinations mediated by the sense organs. Thus Baillarger's notion of automatism is compatible with what is now called an \*entoptic phenomenon – with the restriction, of course, that the notion of entoptic phenomenon refers to the visual modality alone, whereas the term automatism can be related to any of the sensory modalities. The term automatism is also used in a broader sense to denote sensory as well as motor phenomena that are generated unconsciously. Motor phenomena like these were designated by the British classical scholar, writer, and poet Frederic Myers (1843–1901) as motor automatisms. Myers characterized the sensory phenomena as \*sensory automatisms. As he wrote in a book published posthumously in 1903, “The products of inner vision or inner

audition externalised into quasi-percepts, – these form what I term *sensory automatisms*. The messages conveyed by movement of limbs or hands or tongue, initiated by an inner motor impulse beyond the conscious will – these are what I term *motor automatisms*.” Sensory automatisms can manifest themselves in the form of hallucinations, \*illusions, \*dream images, and \*hypnagogic or \*hypnopompic phenomena, all of which are experienced by the affected individual as controlled, guided, or summoned by an alien force. In 1954 the Canadian neurosurgeon Wilder Graves Penfield (1891–1976) suggested that automatisms, referred to by him as \*psychomotor automatisms, may be evoked by local epileptic discharge in the prefrontal or temporal cortex spreading to the diencephalon (i.e. the higher brainstem). He was careful to point out that in order to evoke an attack of automatism, the epileptic activity involved should confine itself to the part of the diencephalon associated with consciousness, leaving the so-called automatic sensory-motor mechanism unaffected. As Penfield wrote, “When a local discharge occurs in prefrontal or temporal areas of the cortex, it may spread directly to the highest brain-mechanism by bombardment (the *mind's mechanism*). When it does this, it produces automatism.” And, “So it is that the mechanism in the higher brain-stem, whose action is indispensable to the very existence of consciousness, can be put out of action selectively! This converts the individual into a *mindless automaton*.” Conceptually, this explanatory model for attacks of automatism is related to Jackson's conception of the \*dreamy state. In the parapsychological literature, the group of sensory automatisms is also believed to include \*apparitions, inspirations, and cases of \*clairvoyance or \*clairaudience. The eponym \*Zingerle's automatosis refers to a syndrome involving closely connected hallucinatory and motor phenomena.

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## Automatosis

see Zingerle's automatosis.

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## Autonomic Aura

A term used to denote a type of \*aura that manifests itself as an autonomic alteration such as palpitations or 'hot flashes', without any objective proof of an autonomic disturbance. Pathophysiologically, autonomic auras are associated primarily with focal epileptic seizures affecting autonomic centres in the CNS. Etiologically, they are associated primarily with paroxysmal neurological disorders such as epilepsy and migraine.

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## Autophonia

Also known as autophony. Both terms stem from the Greek words *autos* (self) and *phōnè* (sound or voice). They translate roughly as 'hearing oneself' or 'hearing one's own voice'. Autophonia is also known as tympanophonia, although the terms actually describe two different aspects of the same otological condition. The Graeco-German neologism *Autophonie* was coined in or shortly before 1868 by the Viennese otologist Josef Gruber (1827–1900) to denote the hyperperception of one's own voice that may accompany disorders of the ear. He introduced the term tympanophonia to denote the objective amplification of the volume of one's voice – as recorded by means of auditory auscultation – in the same group of otological diseases. Today the two terms tend

to be used interchangeably, and their definition has been expanded to include hearing one's own voice, one's breath sounds, arterial murmurs, and other noises of the upper body which can occur in diseases of the middle ear and the nasal fossae, as well as in rapid weight loss caused by wasting disorders such as anorexia nervosa. Autophonia is also an obsolete term for suicide.

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## Autophony

see Autophonia.

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## Auto-representative Phenomenon

A term employed by the French neurologist G. Comar as a synonym for \*internal autoscopia.

### Reference

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## Autoscopic Hallucination

Also referred to as external autoscopic hallucination, \*specular hallucination, mirror hallucination, \*deuteroscopic hallucination, and visual phantom double. The expression autoscopic hallucination can be traced to the Greek words *autos* (self) and *skopeō* (I am looking at). It translates roughly as 'a hallucination in which one sees oneself'. The term autoscopic hallucination was introduced in or shortly before 1891 by the French physician and mesmerist Charles Féré (1852–1907). Today it is used to denote a subclass of the group of \*autoscopic phenomena characterized by the visual perception of an



**Fig. 13** Autoscopic hallucination. Illustration by JDB

exact mirror image of one's physical body (also referred to as one's \*double or \*doppelgänger). Autoscopic hallucinations may be confined to the image of one's face or head and shoulders, but they can also consist of more or less complete bodily images. They typically manifest themselves within the central field of vision, although some cases of peripheral autoscopic hallucinations have been reported as well. The perceived location of autoscopic hallucinations tends to be contralateral to the affected hemisphere. Their perceived distance is often within or just beyond grasping distance from the hallucinator. The duration of autoscopic hallucinatory activity tends to be brief, on the order of several minutes. Autoscopic hallucinations may be preceded by \*simple visual hallucinations. They are often accompanied by other types of \*visual hallucinations or \*illusions. The term \*polyopic autoscopia is used when more than one doppelgänger is perceived at the same time. In 1928, the German psychiatrist Wilhelm Mayer-Gross (1889–1961) published a case of polyopic autoscopia in which the affected individual described the entire room as being filled with doubles. Autoscopic hallucinations have been reported in neurological disorders

(such as epilepsy, migraine, \*delirium, brain tumour, ischaemia, and infection), in the context of psychiatric disorders (such as \*psychotic disorders, mood disorders, anxiety disorders, and \*dissociative identity disorder), as well as during \*hypnagogic or \*hypnopompic states. In addition, a few case reports exist of autoscopic hallucinations manifesting in the hemianopic field in \*hemianopia. Pathophysiologically, autoscopic hallucinations are associated with lesions or processes affecting an area at the temporo-parieto-occipital junction. Autoscopic hallucinations are sometimes classified as a variant of the group of \*reduplicative hallucinations. A classic self-report on autoscopic hallucinations, as well as on \*personifications (i.e. \*compound hallucinations depicting other human beings) can be found in the work of the German chemist Ludwig Staudenmaier (1865–1933).

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## Autoscopic Phenomenon

Also known as \*phantom double. The expression autoscopic phenomenon comes from the Greek words *autos* (self) and *skopeō* (I am looking at). It translates roughly as 'a phenomenon that involves the seeing of oneself'. The group of autoscopic phenomena constitutes a class of \*visual hallucinations depicting a reduplication of one's own

physical body in extracorporeal space (i.e. what is sometimes called a \*reduplicative hallucination). According to the Swiss neuroscientist Olaf Blanke and the German neuropsychologist Christine Mohr, the group comprises the conditions \*out-of-body experience (OBE), \*autoscopy, \*autoscopic hallucination, and \*heautoscopy. \*Sensed presence is sometimes included in this group of phenomena as well. In the older literature, references can also be found to \*negative autoscopy (characterized by the failure to perceive one's mirror image while looking into a mirror) and \*internal autoscopy (i.e. the purported ability to perceive one's own internal organs). Pathophysiologically, autoscopic phenomena are associated with aberrant activity in a region located at the temporo-parieto-occipital junction. Etiologically, they are associated with a variety of conditions, including epileptic seizures, migraine, infections, neoplasms, \*bereavement, a clinical diagnosis of \*schizophrenia, and a clinical diagnosis of \*dissociative disorder. The Dutch psychologist Bernardine J. Ensink (b. 1951), for example, found autoscopic phenomena to be frequently occurring symptoms in a group of 97 women with a history of sexual abuse. Autoscopic phenomena can also be idiopathic or self-induced, as seen in mystics such as the Spaniard Abraham Abulafia (1240–1291?). Considerable overlap exists between the literature on autoscopic phenomena and that on the \*doppelgänger phenomenon. A classic self-report on autoscopic phenomena can be found in the work of the German chemist Ludwig Staudenmaier (1865–1933).

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## Autoscopy

The term autoscopy comes from the Greek words *autos* (self) and *skopeō* (I am looking at). It translates roughly as 'seeing oneself' and is used to denote the act of perceiving a hallucinated mirror image of oneself, viewed from the position of one's own body. The term was introduced in or shortly before 1891 by the French physician and mesmerist Charles Féré (1852–1907). But the phenomenon itself has been described throughout written medical history. Traditionally the book *Meteorology* by the Greek philosopher Aristotle (384–322 BC) is regarded as the first known text to address the subject of autoscopy *avant la lettre*. As Aristotle wrote, "Air must be condensed to act as a mirror, though it often gives a reflection even uncondensed when the sight is weak. Such was the case of a man whose sight was faint and indistinct. He always saw an image in front of him and facing him as he walked. This was because his sight was reflected back to him. Its morbid condition made it so weak and delicate that the air close by acted as a mirror, just as distant and condensed air normally does, and his sight could not push it back." What is now called autoscopy was referred to by the French physician and psychologist Paul Auguste Sollier (1861–1933) as \*external autoscopy. Using the body's boundaries as a guiding principle, Sollier distinguished external autoscopy from \*internal autoscopy, reserving the latter term for a \*visual hallucination depicting the body's internal organs. In (external) autoscopy the resulting image is called an \*autoscopic hallucination. Sollier classified autoscopic hallucinations (both internal and external) as variants of the group of \*coenesthetic hallucinations. Today both are commonly regarded as belonging to the class of \*visual hallucinations (although other sensory modalities may be involved as well, and the purported perceptual quality of autoscopic phenomena has been disputed by some) or to the group of \*reduplicative hallucinations. The duration of autoscopic hallucinations tends to be short, on the order of seconds to several minutes. They may or may not be accompanied by other types of \*visual hallucinations and/or \*illusions. As an isolated symptom, autoscopy would seem to be rare. In accordance with a further subdivision made by Sollier, one may speak of \*positive autoscopy

in instances where the hallucinated image of a \*double is present and of \*negative autoscopia in instances where the individual affected is unable to perceive his or her mirror image when looking into a reflecting surface. Sollier drew up a subclassification of positive autoscopic phenomena, according to the degree to which the hallucination displays the physical characteristics of the person affected. He used the term \*specular autoscopia to denote autoscopic hallucinations identical to the individual's physical appearance. He used the term \*dissimilar autoscopia to denote a variant in which the hallucinated individual is intuitively identified as oneself, in spite of the lack of an exact resemblance to the individual's present physical characteristics (i.e. what is now generally referred to as \*heautoscopia). A third and final variant of positive autoscopia was referred to as \*coenesthetic autoscopia. However, the latter phenomenon would seem to fall outside the class of \*hallucinations proper, being characterized by the sensed presence of one's \*double rather than by its hallucinated presence. Pathophysiologically, autoscopia is associated primarily with aberrant activity in a region located at the temporo-parieto-occipital junction. Etiologically, it is associated with a variety of conditions, including epileptic seizures, migraine, infections, neoplasms, a clinical diagnosis of \*schizophrenia, and a clinical diagnosis of \*dissociative disorder. When autoscopia is attributable to an organic disorder it is referred to as \*symptomatic autoscopia. It can also be idiopathic or self-induced, as seen in mystics such as the Spaniard Abraham Abulafia (1240–1291?). In the latter case the term \*idiopathic autoscopia is used. There is considerable overlap between the literature on autoscopia and that on the \*doppelgänger phenomenon. In the paranormal literature, autoscopia is intimately connected with the notion of bilocation, i.e. the alleged capacity of certain human beings to exist in two places simultaneously. In some versions of the bilocation hypothesis, the second body is regarded as a copy of the original physical body. In other versions, the second body is considered a so-called astral projection of the self, i.e. an 'ethereal' component of the self.

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## Autosomatagnosia

see Hemiasomatognosia.

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## Autosomatamnesia

see Hemiasomatognosia.

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## Autotopagnosia

Also known as autotopagnosia and somatotopagnosia. The term autotopagnosia comes from the Greek words *autos* (self), *topos* (place), *a* (not), and *gnōsis* (insight). It translates loosely as 'not being able to recognize a body part of oneself'. The term was introduced in or shortly before 1908 by the German psychiatrist and neurologist Arnold Pick (1851–1924). Today it is used to denote a condition characterized by the inability or strongly diminished ability to recognize, denominate, or indicate a part of one's body, and in some definitions a body part belonging to someone else. Today the term heterotopagnosia is used largely to denote the symptom's latter connotation. Still broader definitions, however, also include the inability or diminished ability to recognize, denominate, or indicate body

parts in a picture. When there is an inability or strongly diminished ability to recognize, denominate, or indicate objects in general, the term *allopagnosia* is used. Because *autotopagnosia* is often accompanied by comorbid symptoms such as *anomia*, *apraxia*, *visuo-spatial dysfunction*, and/or *global cognitive dysfunction*, descriptions of 'pure' *autotopagnosia* are rare. Pathophysiologically, *autotopagnosia* is associated primarily with discrete lesions affecting the neural pathways connecting the parietal lobe and the thalamus (such as the *corona radiata*, for example). Etiologically, the condition is associated with a variety of processes capable of inflicting such discrete lesions, including infectious disease, vascular disease, neoplasms, and multiple sclerosis. Pick has been credited not only with naming but also with describing *autotopagnosia* for the first time in 1908. In Pick's opinion, however, in *autotopagnosia* the ability to denominate body parts is preserved although the ability to recognize or indicate them is absent. For a long time *autotopagnosia* was considered an artefact of conditions such as *aphasia*, *neglect*, or *cognitive impairment*. Today, however, there is increasing support for the view that it may constitute a discrete symptom indicative of an impairment of body-specific visual representation. *Autotopagnosia* tends to be classified either as an *agnosia* or as a *pointing disorder*. \**Negative autoscopy* (i.e. a phenomenon characterized by the inability to recognize one's own reflection in the mirror) is sometimes classified as a variant of *autotopagnosia*. *Autotopagnosia* should not be confused with \**body schema illusions*.

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## AVH

see Auditory verbal hallucination.

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## *Ayahuasca*-induced Hallucination

*Ayahuasca* is known under many names, including *ayawaska*, *bejuco de oro*, *caapi*, and *yajé*. The name *ayahuasca* is the hispanized version of *ayawaska*, which is Quechua for 'vine of the soul' or 'vine of the spirits'. Both names refer to a pharmacologically complex ritual brew used by Indians in the Amazon region, as well as to the central ingredient of that brew, which has been used since ancient times as an \**entheogen*, a \**hallucinogen*, a therapeutic, and a magical potion, as well as for divination and many other purposes. Although *ayahuasca* was described during the first half of the 18th century by European explorers, the first botanical samples of the vine were not collected until between 1851 and 1854 by the British botanist and explorer Richard Spruce (1817–1893). The central ingredient of *ayahuasca* has been identified as the jungle vine *Banisteriopsis caapi*, the bark of which is either mashed to a pulp and then mixed with cold water or boiled in hot water. *Ayahuasca* is administered orally, in the form of a drink, but dried pieces of the bark can also be smoked. The number of plants used in the preparation of the *ayahuasca* potion can run into the hundreds. As noted by the Canadian anthropologist and ethnobotanist Edmund Wade Davis (b. 1953), "The smell and acrid taste [of *ayahuasca*] was that of the entire jungle ground up and mixed with bile." The potion's psychoactive effects are attributed primarily to the  $\beta$ -carboline alkaloid harmine (in the past also referred to as telepathine, because of its purported telepathic powers), tetrahydroharmine, and harmaline. These alkaloids are believed to act as potent monoamine oxidase inhibitors. Due to the presence of the numerous other ingredients, however, the overall psychoactive effects of *ayahuasca* vary widely. *Ayahuasca*-induced hallucinations have been described as includ-

ing \*geometric visual hallucinations, \*illusions, \*auditory hallucinations, and \*complex visual and \*compound hallucinations depicting scenes, animals (i.e. \*zoopsia), people landscapes, and mythological or cosmic events. Reportedly, the user of *ayahuasca* can also experience a subjective transformation into a wild animal such as a jaguar, an anaconda, or a goshawk. These effects can be accompanied by sexual hyperarousal, euphoria, hypomania, or sedation, as well as by anticholinergic adverse effects such as mydriasis, blurred vision, tachycardia, vertigo, a sense of suffocation, an extremely dry throat, constipation, urinary retention, \*delirium, and sopor. Especially in higher dosages, the use of *ayahuasca* can eventually lead to coma and death. A person intentionally employing *ayahuasca* for the purpose of exploring the psyche may be called a \*psychonaut.

#### References

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#### *Ayawaska*

see *Ayahuasca*-induced hallucination.

# B

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## Background Object of Primary Identification

see Dream screen.

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## Backmasking

see Backward masking.

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## Backward Masking and Illusions

Backward masking is also known as backwards masking and backmasking. All three terms are used in the popular music industry to denote a recording technique in which an auditory message is encrypted by recording it in reverse order onto a track. As a consequence, the encrypted message can only be retrieved by playing the track backwards. The backward masking technique was popularized during the 1960s by The Beatles, and has since been imitated by numerous bands. The urge to retrieve so-called backward messages in popular songs has yielded a number of 'messages' that do not originate from words or sentences recorded backwards, but from regular words or sentences that merely sound like intelligible language when played backwards. These 'messages' are attributed to a \*cognitive illusion called \*auditory pareidolia. Some examples of auditory pareidolia on the basis of back-

ward masking can be found in the pop songs *Another one bites the dust* by Queen (where the reversed sentence "Another one bites the dust" is rendered as "I decide to smoke marihuana"), *Revolution nine* by the Beatles (where the reversed words "Number nine" are rendered as "Turn me on, deadman"), and *Eldorado overture* by the Electric Light Orchestra (where the chanted word "Hallelujah" remains the same when played backwards). The latter phenomenon, where a phoneme remains the same when it is heard in reverse order, is called a phonetic palindrome.

## Reference

Aranza, J. (1983). *Backward masking unmasked. Backward Satanic messages of Rock and Roll exposed*. Shreveport, LA: Vital Issues Pr.

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## Bagel Vision

Also known as doughnut vision and donut vision. The term bagel vision is indebted to the Yiddish verb *beigen* (to bend, to twist). It is used to denote the visual perception of a punched-out or doughnut-shaped image, caused by a central, \*bilateral scotoma. Due to a loss of central vision, and a retention of peripheral vision, faces, for instance, may be perceived in instances of bagel vision as a ring of flesh surrounding a black hole or a void. Bagel vision has been described in relatively rare cases of \*visual aura occurring in the context of migraine. In the literature the terms bagel vision, doughnut vision, and donut vision



**Fig. 1** Bagel vision. Illustration by JDB

are also used to denote a ring-shaped \*scotoma with intact areas of central and peripheral vision.

#### Reference

Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.

### Bananadine and Hallucinations

The neologism bananadine is indebted to the noun banana. It was introduced in 1967 in an article by Max Scherr, editor of the US underground newspaper *Berkeley Barb*, to denote a fictional alkaloid with hallucinogenic properties allegedly present in the inside of banana peels (*Musa x sapientum*). However, biochemical analyses show that banana peels contain no significant amounts of any known psychoactive substances other than serotonin (or its precursor, tryptophan), which is considered inactive when ingested orally or via the lungs. During the late 1960s the news from the *Berkeley Barb* article was amplified through numerous additional publications in the popular media, and through the attention generated by the US Food and Drug Administration's initiative to determine whether bananas should be classified as illicit drugs. Eventually the bananadine story was unmasked as a hoax, but the myth that the smoking or oral ingestion of dried or

baked banana peels can produce hallucinations persisted in certain circles, and continues to resurface from time to time.

#### References

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### Belladonna Delirium

A term used to denote an anticholinergic \*delirium due to intoxication with compounds of the plant *Atropa belladonna*. See the entry *Atropa belladonna* and hallucinations.

### Belladonna-Induced Hallucination

see *Atropa belladonna* and hallucinations.

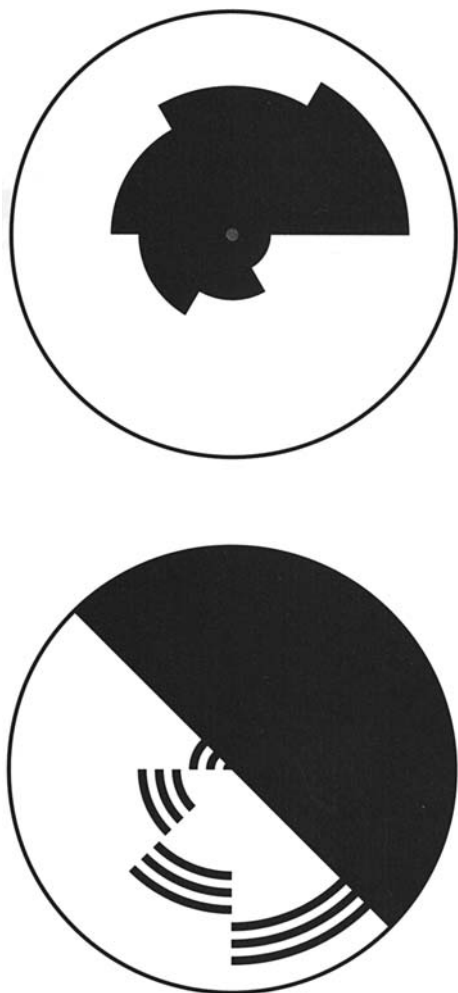
### Benham's Disk

see Benham's top.

### Benham's Top

Also known as Benham's disk, Benham's wheel, and artificial spectrum top. The eponym Benham's top refers to the British amateur scientist and toymaker Charles Edwin Benham (1860–1929), who in 1894 published an account in *Nature* describing a device which he called the artificial spectrum top, with the aid of which illusory colours can be created out of flickering monochromatic light. The device consists of a disc which is half black and half white, and bears three patterns of black concentric lines of increasing size. When the disc is rotated at a speed of around 5–10 revolutions/s, four concentric rings of colour appear. When the disc revolves clockwise, the colours red, green, pale blue, and dark purple can be discerned, running from the centre towards the periphery. When it revolves counter-clockwise, the colours appear





**Fig. 2** Benham's top. Sources: Benham, C.E. (1894). The artificial spectrum top. *Nature*, 51, 113–114; and: Fechner, G.T. (1838). *Ueber eine Scheibe zur Erzeugung subjectiver Farben*. In: *Annalen der Physik und Chemie*. Edited by Poggendorff, J.C. Leipzig: Verlag von Johann Ambrosius Barth

in reverse order. The resulting illusory colours are referred to as pattern-induced flicker colours (PFICs). The underlying effect is known as the Prévost–Fechner–Benham effect. The neurophysiological correlates of this effect are not entirely understood, but it is believed that both the retina

and the primary visual cortex play an active part in its mediation. Benham's top was marketed as a toy for children. A variant of the device, of which Benham was apparently unaware, was described in 1838 by the German psychologist Gustav Theodor Fechner (1801–1887). The illusory colours created by the two devices are therefore generally known as \*Fechner's colours. This phenomenon is classified as a \*physiological illusion.

### References

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- Fechner, G.T. (1838). *Ueber eine Scheibe zur Erzeugung subjectiver Farben*. In: *Annalen der Physik und Chemie*. Edited by Poggendorff, J.C. Leipzig: Verlag von Johann Ambrosius Barth.
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### Benham's Wheel

see Benham's top.

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### Benign Hallucination

Also referred to as non-morbid hallucination. The term benign hallucination is indebted to the Latin words *bene* (good) and *gignere* (to entail, to bring forth). It was introduced in 1960 by the American psychiatrist Gordon Forrer to denote a hallucination occurring outside the context of illness or pathology. Forrer uses the term benign hallucination in opposition to the term \*malignant hallucination (i.e. a hallucination characterized by persistence, and associated with pathology, as in individuals with a clinical diagnosis of \*schizophrenia). As Forrer maintains, "Hallucinations are surprisingly commonplace occurrences. They may be brief and benign as in the mundane auditory hallucination of 'hearing' one's name when one is quite alone. Or they may be persistent and malignant as in the auditory hallucination of paranoid schizophrenia repeatedly accusing the subject of aberrant

practices. In the benign hallucinatory experiences of everyday life only the fact of the experience is usually recalled. In the malignant hallucination of psychosis, preoccupation with the subjective sensory experience becomes intense. . . . Benign hallucinations terminate by more or less complete repression of the experience. Malignant hallucinations, on the other hand, spawn delusions, oftentimes themselves ceasing to exist in a manner analogous to plants which, in sprouting, replace the seeds from which they grew." In clinical practice, the term benign hallucination is used to denote hallucinatory phenomena such as \*bereavement hallucinations, \*simple misperceptions, \*visual hallucinations occurring in the context of \*Charles Bonnet syndrome, \*musical hallucinations occurring in the elderly, and \*deathbed visions.

#### Reference

Forrer, G.R. (1960). Benign auditory and visual hallucinations. *Archives of General Psychiatry*, 3, 95–98.

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### Bentall and Slade's Definition of Hallucinations

In 1988 the British psychologists Richard P. Bentall (b. 1956) and Peter D. Slade defined hallucinations as follows. "Any percept-like experience which (a) occurs in the absence of an appropriate stimulus, (b) has the full force or impact of the corresponding actual (real) perception, and (c) is not amenable to direct and voluntary control by the experiencer."

#### Reference

Slade, P.D., Bentall, R.P. (1988). *Sensory deception. A scientific analysis of hallucination*. London: Johns Hopkins University Press.

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### Benzodiazepine-Induced Hallucination

The benzodiazepines (or 'benzos' for short) are formally known as CNS active 1,4-benzodiazepines. These substances constitute a group of CNS depressants whose major action is attributed to the potentiation of the gamma

aminobutyric acid (GABA) system via the benzodiazepine receptors present in the CNS. The name benzodiazepine refers to the benzene and diazepine ring systems constituting the core chemical structure of classic benzodiazepine substances. Some examples of classic benzodiazepines are chlordiazepoxide, diazepam, lorazepam, and oxazepam. Historically, chlordiazepoxide was the first of the centrally acting 1,4-benzodiazepine derivatives. It was developed during the 1950s by the group headed by the Polish-Jewish-American chemist Leo Henryk Sternbach (1908–2005), and introduced for clinical use in 1960. Diazepam followed in 1963, with other benzodiazepines patented by Sternbach (and others) following successively. In biomedicine the benzodiazepines are prescribed for a wide variety of purposes, including the treatment of insomnia, epileptic seizures, anxiety, depression, agitation, aggression, and acute alcohol withdrawal. Because of their sedative and anxiolytic properties, the benzodiazepines are also widely misused. Their consumption may lead to dependency, as well as to a multitude of adverse effects. \*Nightmares and vivid \*dreaming have been reported during benzodiazepine use, as well as alterations in the qualitative character of dream images. Reports of benzodiazepine-induced hallucinations are less common. In 1968 the American psychiatrist Davis S. Viscott published a report on seven cases of apparent hallucinatory activity following the first-time use of chlordiazepoxide. However, it is unclear from Viscott's report whether the hallucinatory phenomena at hand were de novo hallucinations, or pre-existent hallucinations which the affected individuals had apparently never talked about until they came to do so under the influence of chlordiazepoxide. Benzodiazepine withdrawal, on the other hand, is notorious for its many perceptual rebound effects. These include \*sensory deceptions and distortions such as \*hyperaesthesia, \*metamorphopsias, \*visual hallucinations, \*auditory hallucinations, \*formication, and \*body schema illusions. Although the effects of benzodiazepine use in individuals with a clinical diagnosis of \*schizophrenia have been studied extensively throughout the years, its influence upon hallucinations and other psychotic symptoms remains somewhat unclear. Some studies indicate that the benzodiazepines may have a potentiating effect on antipsychotic substances, while others fail to record such an effect, or even report a decrease

in the effectiveness of antipsychotic agents under benzodiazepine co-medication.

### References

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## Bereavement Hallucination

Also known as post-bereavement hallucination and grief hallucination. All three terms are used to denote a heterogeneous group of \*sensory deceptions occurring in the context of grief over the loss of a spouse or other loved one. As to their content, bereavement hallucinations typically involve the deceased person's physical characteristics. Due to their \*xenopathic character, bereavement hallucinations often have a highly realistic appearance. However, individuals in possession of proper reality monitoring skills tend to recognize these quite easily as non-sensory percepts. The prevalence of bereavement hallucinations in widowed individuals has been found to lie between 30% and 60%. In a classic study by the British physician W. Dewi Rees among 363 widowed persons, almost 50% reported having had one or more episodes of bereavement hallucination. Among these, \*sensed presence (which is usually classified as a \*hallucinoid experience not a \*hallucination proper) was the most prevalent sensory deception, followed by \*visual hallucinations, \*auditory hallucinations, \*tactile hallucinations, and \*compound hallucinations. Recurrent hallucinatory episodes were most prevalent during the first decade of widowhood. Their mean duration varied from several years to decades in individuals above 40 years of age. The incidence of bereavement hallucinations among individuals under the age of 40 was significantly lower, as was the incidence among childless widowed persons, and among those who reported having had an unhappy marriage. Bereavement hallucinations are often described as being beneficial in nature, hence the tendency to classify them as \*benign hallucinations. However, they can also be a source of considerable distress. The term pathological grief reaction has been proposed to denote the occurrence of halluci-

natory symptoms that have no bearing on the deceased individual. The American psychiatrist Lloyd A. Wells describes two individuals with a pathological grief reaction who reported visual hallucinations reminiscent of \*autosopic phenomena. As to the pathophysiology of bereavement hallucinations it has been suggested that these may fall into either the class of \*perceptual release phenomena, or the class of \*reperceptions. As a footnote to the literature on bereavement hallucinations, it is worth mentioning that the American-Canadian neuropsychologist Michael A. Persinger (b. 1945) found a positive correlation between corpuscular radiation from the Sun (i.e. solar wind), and the incidence of bereavement hallucinations. Persinger interpreted this remarkable finding as circumstantial evidence for the involvement of temporal magnetic-mediated microseizures in their mediation. Conceptually as well as phenomenologically (and perhaps pathophysiological as well), bereavement hallucinations would seem to display some overlap with hallucinations occurring in \*Charles Bonnet syndrome (CBS). In parapsychology, as well as in various religions, it is not uncommon to designate bereavement hallucinations as a form of communication with deceased individuals or \*apparitions. They are therefore referred to as post-bereavement apparitions. To suspend judgement on the issue of whether such apparitions exist or not, the neutral term \*idionecrophany has been proposed to denote any sensory experience involving an alleged contact with the dead.

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- Rees, W.D. (1971). The hallucinations of widowhood. *British Medical Journal*, 4, 37–41.
- Wells, L.A. (1983). Hallucinations associated with pathologic grief reaction. *Journal of Psychiatric Treatment and Evaluation*, 5, 259–261.

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## Berrios's Definition of Hallucinations

In 2005, the British psychiatrist and historian of psychiatry German E. Berrios defined hallucinations as follows. "Hallucination is the generic name for a class of utterances reporting subjective experiences (putatively) perceptual in nature which occur in the (arguably) absence of an adequate external stimulus. The said reports may implicate all sensory modalities giving rise to so-called hallucinations of vision, audition, touch, olfaction, taste and coenesthesia."

### Reference

Berrios, G.E. (2005). On the fantastic apparitions of vision by Johannes Müller. *History of Psychiatry*, 16, 229–246.

in the treatment of individuals with a clinical diagnosis of \*schizophrenia. Beta-blocker therapy did not live up to this expectation, but the claim that these substances are more than occasionally associated with hallucinatory activity would seem to be ill founded. Insomnia, lively \*dreams, and \*nightmares, on the other hand, have been reported quite frequently by users of beta-blockers.

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## Beta-Blockers and Hallucinations

Beta-blockers are also referred to as  $\beta$ -blockers, beta-adrenergic blockers, beta-antagonists, beta-adrenergic antagonists, beta-adrenergic blocking drugs, and beta-adrenoceptor antagonists. All these names are used to denote a group of chemical substances that have the capacity to modulate the activity of the sympathetic nervous system by blocking the action of endogenous catecholamines such as adrenaline and noradrenaline upon beta-adrenergic receptors. In biomedicine, beta-blockers are prescribed for a broad range of indications, including glaucoma, cardiovascular conditions such as congestive heart failure, cardiac arrhythmia, and mitral valve prolapse, as well as such CNS conditions as migraine, tremor, and akathisia. Although hallucinations have for decades been reported as a possible adverse effect occurring in individuals using beta-blockers – more specifically, the group of lipophilic beta-blockers – the results from empirical studies are ambiguous in this respect. While it is true that case reports involving \*visual hallucinations, \*formicative hallucinations, \*verbal auditory hallucinations, \*musical hallucinations, and other \*sensory deceptions in association with the use of beta-blockers have been published, it should be borne in mind that propranolol, historically the first beta-blocker available in the United States, was at one time considered an alternative for the use of antipsychotic agents

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## Bicameral Mind Theory

The expression bicameral mind is indebted to the Latin words *bi* (two) and *camera* (room). It refers to the purported existence of two virtual rooms or compartments within the mind. The bicameral mind theory was formulated during the 1960s, and subsequently published in book form in 1976 by the American psychologist Julian Jaynes (1920–1997). It involves the hypothesis that ontogenetically, modern human consciousness might well originate from the breakdown of a primitive bicameral 'mind-space', and that hallucinations can therefore be interpreted as a sign of regression to that prior evolutionary stage. Jaynes speculates that the pre-conscious mentality characteristic of individuals in ancient cultures was consciously aware of endogenously mediated percepts, but not of their being mediated by the mind's own 'second chamber'. In this sense, Jaynes' theory may be seen as a conceptual precursor of today's \*inner speech models of hallucinatory experience, notably the \*defective corollary discharge model, which seeks to explain the misattribution of endogenous linguistic signals in individuals with \*verbal auditory hallucinations (VAH) in terms of a failure in corollary discharge (or 'feedforward') signal that normally allows the brain's speech perception areas to recognize an incoming signal as 'its own'. Jaynes illustrates his bicameral mind thesis with numerous references

to Homer (c. 750–c. 700 BC), who depicted the heroes of the *Iliad* as individuals devoid of self-awareness as we know it today. As a consequence, according to Jaynes, these individuals seldom referred to themselves, and seemed to lack the linguistic tools to express their own strivings and emotions. As Jaynes maintains, “In distinction to our own subjective conscious minds, we can call the mentality of the Myceneans a *bicameral mind*. Volition, planning, initiative is organized with no consciousness whatever and then ‘told’ to the individual in his familiar language, sometimes with the visual aura of a familiar friend or authority figure or ‘god’, or sometimes as a voice alone. The individual obeyed these hallucinated voices because he could not ‘see’ what to do by himself.” Jaynes interprets Homer’s narrative style as a sign that the mind of the Myceneans was radically different from ours, i.e. that it lacked our present introspective, self-reflective nature, rendering it incapable of unmasking hallucinations as phenomena from within. As Jaynes suggests, “What triggered these hallucinations? I suggest it was even the slight stress of making a decision in a novel circumstance, whereas in ourselves in modern times the stress threshold for such triggering of a verbal hallucination is much higher. The reason they are so prevalent in all cultures today, in the hospital patients and homeless. . . , in children and speechless quadriplegics, is because they were once the genetic basis of this ancient mentality, and the genes for this potentiality are still with us today. Verbal hallucinations, we think, evolved along with the evolution of language during the late Pleistocene as the response part of the brain register of all admonitory information. Its survival value at first was simply to direct an individual in various long-term tasks, which cued their occurrence. By 9000 BC, such voices were called what we call gods. The bicameral mind produced a new kind of social control that allowed agricultural civilizations to begin.” Jaynes’ bicameral mind hypothesis has been discarded and defended for many different reasons, but scientific interest in his work has been re-awakened by the consistent findings of right-sided activation patterns in the brain, as retrieved with the aid of neuroimaging studies in individuals with verbal auditory hallucinations.

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Jaynes, J. (1976). *The origin of consciousness in the breakdown of the bicameral mind*. Boston, MA: Houghton Mifflin Company.

Kuijsten, M., ed. (2006). *Reflections on the dawn of consciousness: Julian Jaynes’s bicameral mind theory revisited*. Henderson, NV: Julian Jaynes Society.

Sher, L. (2000). Neuroimaging, auditory hallucinations, and the bicameral mind. *Journal of Psychiatry & Neuroscience*, 25, 239–240.

Sommer, I.E.C., Aleman, A., Kahn, R.S. (2003). Left with the voices or hearing right? Later-alization of auditory verbal hallucinations in schizophrenia. *Journal of Psychiatry and Neuroscience*, 28, 17–18.

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#### Bidwell’s Ghost

Also referred to as \*Purkinje afterimage. The eponym Bidwell’s ghost refers to the British physicist Shelford Bidwell (1848–1909). It is used to denote a \*negative afterimage that appears second in a temporal sequence of \*afterimages resulting from exposure to a brief light stimulus. Like other negative afterimages, Bidwell’s ghost takes on a hue complementary to that of the original optical stimulus. Bidwell’s ghost is commonly classified as a \*physiological illusion.

#### Reference

Brown, J.L. (1965). *Afterimages*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: Wiley.

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#### Bilateral Auditory Hallucination

see Bilateral hallucination.

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#### Bilateral Hallucination

Also known as bilateral auditory hallucination. Both expressions are indebted to the Latin words *bi* (two) and *latus* (side). The term bilateral hallucination translates roughly as ‘two-sided hallucination’. The term is used mainly with refer-

ence to hallucinations occurring in the auditory modality. In a loose sense, it is used to denote an \*auditory hallucination subjectively localized as coming either from both sides of the head, or from an indefinite location. In a more restricted sense, the term bilateral hallucination has been used since the late 19th century to denote an auditory hallucination that has a different quality and/or content for each side of the head. Thus the affected individual may hear pleasurable and encouraging voices in the right ear, and abusive, threatening voices in the left ear. Or the affected individual may hear a female voice in the right ear, and a male voice in the left. The French alienist Jacques Joseph-Valentin Magnan (1835–1916) considers bilateral hallucinations in the restricted sense as indicative of the dual nature and functional independence of the cerebral hemispheres. On the basis of four individuals he studied, Magnan speculates that bilateral hallucinations may not be dependent upon peripheral lesions of the auditory apparatus, but rather upon the involvement of “the cortical sensorial centres”. The term bilateral hallucination is used in opposition to the term \*unilateral hallucination.

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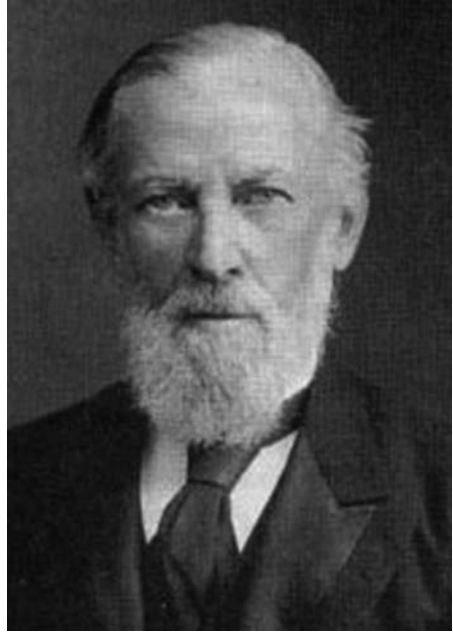
## Bilateral Scotoma

see Bilateral spectrum.

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## Bilateral Spectrum

Also known as bilateral scotoma. The term bilateral spectrum comes from the Latin words *bi* (two), *latus* (side), and *spectrum* (image, \*apparition). It is used to denote a relatively rare \*fortification spectrum (i.e. a \*scintillating scotoma), occurring in the context of a \*migraine aura, whose development is exactly synchronized in the two hemifields. As a result, the bilateral spectrum may present in the form of a single



**Fig. 3** Sir William Richard Gowers

central or pericentral spectrum. Various types of bilateral spectra (including the \*rainbow spectrum) were described in 1904 by the British neurologist Sir William Richard Gowers (1845–1915). Bilateral negative scotomata (i.e. regions of loss of vision) occasionally develop into transient \*blindness. In those rare cases where the tactile cortex is affected as well, a total loss of body-sense (i.e. \*acnesthesia) may be experienced. As the involvement of both hemifields in fortification spectra is extremely rare, and cannot be explained with recourse to current hypotheses involving the mediation of these phenomena in a single cerebral hemisphere, the British neurologist Oliver Wolf Sacks (b. 1933) notes that “The existence of such scotomata poses very difficult problems to those who postulate a local, unilateral process as the basis of migraine auras.”

### References

- Gowers, W.R. (1904). *Subjective sensations of sight and sound: Abiotrophy, and other lectures*. Philadelphia, PA: P. Blakiston's Son & Co.
- Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.

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**Binasal Hemianopia**

see Hemianopia.

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**Binocular Diplopia**

see Diplopia.

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**Binocular Illusion**

The term binocular illusion is indebted to the Latin words *bi* (twice) and *oculus* (eye). It is used to denote an \*illusion that depends for its mediation on a coordinated effort of the two eyes. Two examples of binocular illusions are the \*hole-in-the-hand and the \*floating-finger illusion.

**Reference**

Gurney, R.W. (1938). A binocular illusion. *Nature*, 141, 1060.

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**Binswanger and Siemerling's Definition of Hallucinations**

In 1907 the German psychiatrists Otto Binswanger (1852–1929) and Ernst Siemerling (1857–1931) defined hallucinations as follows. "We designate hallucinations as sense perceptions which, without stimulation of the sense organ involved by an external object, occur as a mere consequence of internal stimuli."

**Reference**

Binswanger, O., Siemerling, E. (1907). *Lehrbuch der Psychiatrie. Zweite vermehrte Auflage*. Jena: Verlag von Gustav Fischer.

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**Bio-Introscopy**

see Eyeless vision.

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**Bipartition Fantasy**

see Sensed presence.

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**Bipolar Disorder and Hallucinations**

see Mood disorder and hallucinations.

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**Birgitta Birgersdotter**

see Bridget of Sweden.

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**Birgitta of Vadstena**

see Bridget of Sweden.

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**Bistable Figure**

see Ambiguous illusion.

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**Bitemporal Hemianopia**

see Hemianopia.

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**Black Hemianopia**

see Hemianopia.

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**Black Patch Delirium**

Also known as black patch psychosis, black patch syndrome, black patch disease, and cataract delirium. The term black patch delirium was introduced in 1958 by the American philosopher, psychiatrist, and thanatologist Avery D. Weisman (b. 1914?), and his colleague Thomas Paul Hackett, Jr. (1928–1988) to denote an acute confusional state dominated by \*complex visual hallucinations in individuals wearing a bilateral eye patch following cataract surgery. Although different in name, similar hallucinatory and delirious states occurring after cataract surgery have been described since around 1900. As far as the visual hallucinations are concerned, black patch delirium appears to display a certain phenomenological overlap with \*Charles Bonnet syndrome.

However, the two syndromes would seem to differ with respect to the presence of additional psychotic or delirious symptoms concomitant to black patch delirium, and the absence of any such additional signs or symptoms in Charles Bonnet syndrome. Pathophysiologically, the hallucinations occurring in the context of black patch delirium tend to be regarded as \*deafferentiation phenomena or \*perceptual release phenomena comparable to the hallucinations occurring in the context of \*sensory deprivation. Etiologically, ample attention has also been drawn to the possible influence of toxic substances such as anaesthetics, therapeutics, illicit drugs, and alcohol, to co-morbid disorders, and to psychological mechanisms such as homesickness, feelings of distress, and feelings of vulnerability. The nosological status of black patch delirium has been contested by some authors on the grounds that, in a phenomenological and pathophysiological sense, it does not seem to differ from \*delirium proper or from senile forms of \*psychosis. Today the term black patch delirium is used only infrequently in the literature. As today's state-of-the-art postoperative care of cataract patients is directed at the prevention of delirium, it may well be that the true incidence of disorders formerly designated as black patch delirium is also somewhat on the wane.

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- Weisman, A.D., Hackett, T.P. (1958). Psychosis after eye surgery. *New England Journal of Medicine*, 258, 1284–1289.

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## Black Patch Disease

see Black patch delirium.

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## Black Patch Psychosis

see Black patch delirium.

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## Black Patch Syndrome

see Black patch delirium.

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## Blake, William (1757–1827)

A British poet, painter, and printmaker who from childhood onwards experienced \*dreams and \*visions depicting \*apparitions and metaphysical scenes. At the age of 4, he claimed to have seen the face of God “put his head to the window”, and at the age of around 10 he saw “a tree filled with angels, bright angelic wings bespanning every bough like stars”. The visions recurred throughout his life, along with \*verbal auditory hallucinations which he attributed to his deceased brother (with whom he continued to converse daily), and to angels, Archangels, etc. who dictated poems to him, and infused the themes of his visual art. Retrospective diagnosis is a deli-



**Fig. 4** William Blake. Engraving (1808) by Luigi Schiavonetti, after a portrait (1807) by Thomas Phillips. Source: Collection of G.E. Bentley, Jr





**Fig. 5** Ezekiel's Wheels (c. 1803–1805). Watercolour by William Blake. Source: Museum of Fine Arts, Boston

cate issue, but it has been suggested that Blake may have suffered from bipolar disorder or from \*ecstatic auras occurring in the context of temporal lobe epilepsy.

### References

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## Blank Hallucination

The term blank hallucination was introduced in or shortly before 1961 by the German-American psychoanalyst Max M. Stern (1895–1982) to denote a collection of simple hallucinatory phenomena such as the sense that one is floating in space, changes in equilibrium, perceived changes in body size (i.e. \*macro- and \*microsomatognosia), hazy blurrings of perception, and so-called cloudlike phenomena, as well as some types of \*formed hallucinations. In Stern's own words, "Blank hallucinations are stereotyped sensory perceptions without appropriate external stimuli. Lacking any content related to persons, objects, or events, they are close to elementary hallucinations as which we designate such unformed perceptions as sparks, lightning streaks, cloudlike phenomena, etc. They differ in intensity, frequency, and duration, ranging from *formes frustes* like hazy blurring of perception, to full hallucinations. They may last a few seconds, or minutes, hours, or months." In conformity with the psychoanalytic theory, Stern suggests that blank hallucinations often make their first appearance in childhood, primarily around the oedipal phase. Moreover, he maintains that blank hallucinations can recur throughout the individual's life in response to stress or frustration, either as an accompanying symptom of emotional states such as anger or rage, or as a \*hypnagogic phenomenon before falling asleep. Stern conceptualizes blank hallucinations as a collection of early defense mechanisms that mimic the soothing experience of suckling at the breast. The term blank hallucination is sometimes used in a wider sense to include the \*Isakower phenomenon, the \*dream screen, and abstract perceptions.

### References

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## Bleuler, Paul Eugen (1857–1939)

A Swiss psychiatrist, well known for his innovative work in general psychiatry, and, more specifically, for his conceptualization of \*schizophrenia. Bleuler's life-long devotion to psychiatric care and research was probably inspired in great part by his sister, who suffered from a chronic psychotic disorder with catatonic features, and who resided at the Burghölzli Hospital in Zollikon with Bleuler and his family. Bleuler himself experienced \*synaesthasias of the phoneme-colour type (i.e. hallucinated colours in association with spoken words).

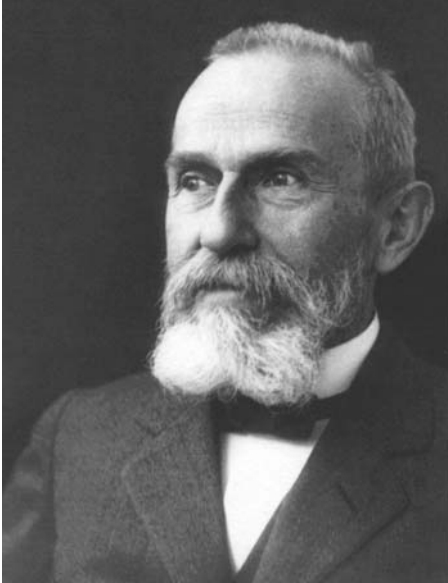
### Reference

- Bleuler, E., Lehmann, K. (1881). *Zwangsmässige Lichtempfindungen durch Schall und verwandte Erscheinungen auf dem Gebiet der anderen Sinnesempfindungen*. Leipzig: Fues's Verlag.

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## Bleuler's Definition of Hallucinations

In his classic textbook of psychiatry, the Swiss psychiatrist Paul Eugen Bleuler (1857–1939) defines hallucinations as follows. "*Hallucinations* are perceptions without a corresponding stimulus externally: everything that one perceives can also become a hallucination, in such a way, that the various elements can be combined freely; a hallucinated lion can have wings, a human figure can be composed out of the properties of various persons. Moreover, pathological brain functions evidently evoke internal perceptions that were not available before."



**Fig. 6** Eugen Bleuler

#### Reference

Bleuler, E. (1923). *Lehrbuch der Psychiatrie. Vierte Auflage*. Berlin: Verlag von Julius Springer.

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### Bleuler's Definition of Illusions

In his classic textbook of psychiatry, the Swiss psychiatrist Paul Eugen Bleuler (1857–1939) defines \*illusions as follows. “*Illusions* are morbidly altered genuine perceptions: The striking of the hour is perceived as a term of abuse, or as a promise; the clutched hand is rejected as a cold ‘death hand’; people are seen as standing on their heads, instead of the white colour of a face a black one is seen, instead of a nurse a waitress.”

#### Reference

Bleuler, E. (1923). *Lehrbuch der Psychiatrie. Vierte Auflage*. Berlin: Verlag von Julius Springer.

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### Blindness and Hallucinations

Visual hallucinations occurring in individuals with impaired vision have been reported since ancient times. Perhaps the best-known historical example is the description of Charles Lullin's \*visual hallucinations, as rendered by his grandson Charles Bonnet (1720–1792), and thereafter commonly referred to as the \*Charles Bonnet syndrome. Visual hallucinations are also known to occur, albeit less frequently, in partial visual field defects such as \*hemianopia (resulting in so-called \*hemianopic hallucinations), \*quadrantanopsia, central scotoma, and \*amblyopia. See also the entries Ictal blindness, Hypnotic blindness, Hysterical blindness, Change blindness, Inattentional blindness, and Negative hallucination.

#### Reference

Freiman, Th.M., Surges, R., Vougioukas, V.I., Hubbe, U., Talazko, J., Zentner, J., Honegger, J., Schulze-Bonhage, A. (2004). Complex visual hallucinations (Charles Bonnet syndrome) in visual field defects following cerebral surgery. Report of four cases. *Journal of Neurosurgery*, 101, 846–853.

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### Blindsight

A term introduced in 1974 by the British neuropsychologists Lawrence Weiskrantz (b. 1926) et al. to denote residual vision in cases of cortical blindness, especially when there is a corresponding lack of awareness of the visual capacity on the part of the affected individual. Cortical blindness is attributed to lesions of the primary visual cortex (also referred to as V1, area 17, area OC, and striate cortex). The resulting \*scotomata, varying in size from a relatively minor area to the entire hemifield (as in \*hemianopia) are perceived within the visual field contralateral to the CNS lesion at hand. Individuals with lesions to V1 are not consciously aware of any visual stimuli presented within the scotomatous region. However, during the 1970s Weiskrantz et al. demonstrated that some perceptual information may nevertheless be detected by individuals suffering from cortical blindness. The geniculostriate pathway, projecting from the retina towards V1, is the largest

route into striate cortex. But it is not the only one. Empirical research has indicated that there are at least six other branches of the optic nerve that take a different route into striate cortex, and that some routes may even project into the extrastriate cortex. The residual perception of visual stimuli by individuals with blindsight is attributed to these latter pathways, i.e. the pathways projecting into the extrastriate and remaining striate cortex while bypassing the geniculo-striate system.

### Reference

Weiskrantz, L. (1986). *Blindsight. A case study and implications*. Oxford: Clarendon Press.

## Blind Spot

Also known as Mariotte's spot, physiological scotoma, physiological blind spot, and punctum caecum. All five terms are used to denote the physiological 'hole' existing in each monocular field of vision that corresponds morphologically with the optic disc, i.e. the region of the retina where the optic nerve ending is located, and where, as a consequence, no photoreceptors are present. Although humans and other vertebrates are blind to objects and visual stimuli in this part of the visual field, the missing perceptual information is automatically compensated for by the other eye in binocular vision, and 'filled in' by the brain (or mind, in a dualist reading) in monocular vision. The eponym Mariotte's spot refers to the French physicist and priest Edme Mariotte (c. 1620–1684), who in 1666 was the first to document the existence of the blind spot. In a broader reading, the term blind spot is used to denote any scotomatous region existing within the visual field. The so-called 'filling-in' of the blind spot is classified as a \*fiction illusion.

### References

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- Mariotte, E. (1717). *Oeuvres de Mr. Mariotte, de l'Académie Royale des Sciences; divisées en deux tomes. Seconde tome*. Leide: Pierre Vander Aa.

## Blue-Field Entoptic Phenomenon

Also known as Scheerer's phenomenon, after the German ophthalmologist Richard Scheerer. Both terms refer to an \*entoptic phenomenon characterized by tiny bright dots moving quickly and semi-randomly across the visual field, especially when viewed against a background of bright blue light. The blue-field entoptic phenomenon is a physiological effect attributed to the movement of lymphocytes (or erythrocytes, in a different reading) within the capillaries overlying the retina. The sudden acceleration of these bright dots is considered synchronous with the systole. Although the phenomenon had been described by at least a dozen authors, it was Scheerer who in 1924 first drew clinical attention to it. The blue-field entoptic phenomenon should not be confused with \*muscae volitantes.

### References

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- Scheerer, R. (1924). Die entoptische Sichtbarkeit der Blutbewegung im Auge und ihre klinische Bedeutung. *Klinisches Monatsblatt für Augenheilkunde*, 73, 67–107.
- Sinclair, S.H., Azar-Cavanaugh, M., Soper, K.A., Tuma, R.F., Mayrovitz, H.N. (1989). Investigation of the source of the blue field entoptic phenomenon. *Investigative Ophthalmology and Visual Science*, 4, 668–673

## Blue Vision

see Cyanopsia.

## Bodily Hallucinated Smell

see Intrinsic olfactory hallucination.

## Bodily Hallucination

Also known as body sensation hallucination. Both terms are used interchangeably as umbrella terms for the notions of \*tactile hallucination

and \*somatic hallucination. In other words, both terms refer to a hallucination experienced in the somatosensory modality that may appear to stem either from an extracorporeal or an intracorporeal source. The 1982 *Manual for the Assessment and Documentation of Psychopathology* (AMDP) defines bodily hallucinations as “unfounded tactile and somatic perceptions including touch, kinesthetic, pain, pressure, and thermic phenomena.” As the authors of the AMDP maintain, “Many such hallucinations have the character of being produced by external forces, e.g. the patient has the feeling of being abused sexually or by electricity or ‘rays.’” Somewhat unusually, the AMDP employs the term \*coenesthetic hallucination as a synonym for the term bodily hallucination.

#### Reference

Guy, W., Ban, T.A., eds. (1982). *The AMDP-system: Manual for the assessment and documentation of psychopathology*. Berlin: Springer.

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### Body Dysmorphic Disorder (BDD) and Hallucinations

The term body dysmorphic disorder was introduced in 1994 in the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) to denote a disorder characterized by an imagined defect in appearance, or excessive concern or preoccupation with a slight physical defect. Although in clinical practice BDD can be diagnosed in the absence of any overt illusory or hallucinatory symptoms, in some cases an organic somatosensorial disturbance can be found to exist. It has been suggested that this disturbance may arise as a consequence of aberrant neurophysiological activity in the parieto-occipital regions representing the body schema. Such somatosensorial disturbances may entail \*body schema illusions such as \*microsomatognosia, \*macro-somatognosia, \*kinaesthetic hallucinations, and \*proprioceptive hallucinations. In diagnostic classifications such as the DSM, BDD is classified as a somatoform disorder. A conceptual precursor of BDD was described in 1886 by the Italian psychiatrist Enrico Morselli (1852–1929). He called this nosological category dysmorphophobia.

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- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders. Fourth edition*. Washington, DC: American Psychiatric Association.
- Morselli, E., Jerome, L. (2001). Dysmorphophobia and taphephobia: Two hitherto undescribed forms of insanity and fixed ideas. *History of Psychiatry*, 12, 103–107.
- Yaryura-Tobias, J.A., Neziroglu, F., Torres-Gallegos, M. (2002). Neuroanatomical correlates and somatosensorial disturbances in body dysmorphic disorder. *CNS Spectrum*, 7, 432–434.

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### Body Photism

A term used to denote a type of \*photism (i.e. a hallucinated patch of light) consisting of a light emanating from one’s own body. Body photism has occasionally been reported in association with \*out-of-body experiences. It should not be confused with the parapsychological notion of the \*luminous phenomenon.

#### Reference

- Arzy, S., Idel, M., Landis, Th., Blanke, O. (2005). Speaking with one’s self. Autoscopical phenomena in writings from the Ecstatic Kabbalah. *Journal of Consciousness Studies*, 12, 4–30.

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### Body Schema Disturbance

see Body schema illusion.

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### Body Schema Illusion

Also known as body schema disturbance, \**somato-éidolie*, \*disorder of corporeal awareness, illusion of corporeal transformation, and illusion of corporeal displacement. All six terms are used to denote an illusory change in the size, relation, position, and/or movement of one’s own body parts. Some examples of body schema illusions are \*kinaesthetic hallucinations, \*proprioceptive hallucinations, \*microsomatognosia, \*macro-somatognosia, \*splitting of the body image, \*aschematia, the

\*rubber hand illusion, the \*illusory displacement of limbs, the \*illusory arm extension, the \*Pinocchio illusion, \*Aristotle's illusion, and the \*floating finger illusion. In clinical practice, the majority of the body schema illusions affect only a part (or various parts) of the body. Rare instances where the whole body is involved are referred to as whole body schema illusion. Pathophysiologically, body schema illusions are associated primarily with lesions affecting those parts of the parietal lobe or parieto-occipital region involved with bodily representations and/or representations of movement. Etiologically, they are associated primarily with paroxysmal neurological disorders such as migraine and epilepsy. It has been speculated that the topological distribution of symptoms in body schema illusions reflects the extension of the representation of body parts in the brain's sensory maps. As noted by the British neurologist Macdonald Critchley (1900–1997), these sensory maps would seem to extend far beyond the parietal lobe. As Critchley maintains, "Positive and negative modifications of corporeal awareness may be met with in lesions at all levels of the neuraxis, but the parietal lobes occupy a special and important role in this problem. More particularly, the parietal region of the *minor hemisphere* is commonly regarded as being of special significance, and there has been a tendency to speak of 'localization' or 'representation' of the body image within this particular region of the brain. This mode of thinking is probably a dangerous oversimplification." In 1963, Critchley proposed the term corporeal awareness as an alternative for the expressions body image and body schema, arguing that these latter terms "fail to indicate the combined properties of a concept and a percept". As a corollary, Critchley designates body schema illusions as 'disorders of corporeal awareness'.

#### References

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- Leker, R.R., Karni, A., River, Y. (1996). Microsomatognosia: Whole body schema illusion as part of an epileptic aura. *Acta Neurologica Scandinavica*, 94, 383–385.
- Podoll, K., Robinson, D. (2000). Macrosomatognosia and microsomatognosia in migraine

art. *Acta Neurologica Scandinavica*, 101, 413–416.

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### Body Sensation Hallucination

see Bodily hallucination.

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### Bonnet Syndrome

see Charles Bonnet syndrome (CBS).

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### Border

see Corona phenomenon.

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### Borderline Personality Disorder (BPD) and Hallucinations

Borderline personality disorder (BPD) is also known as emotional regulation disorder (ERD), emotional intensity disorder (EID), and unstable personality disorder (UPD). The expression borderline personality disorder evolved out of the term borderline neurosis, which was introduced in 1938 by the American neurologist and psychiatrist Adolph Stern (1878–1958), the first American psychoanalyst who was analyzed by Sigmund Freud (1856–1939) himself. Stern introduced the expression borderline neurosis to designate a diagnostic category characterized by neurotic personality traits as well as psychotic symptoms such as delusions and – infrequently occurring – hallucinations. Thus the name borderline neurosis used to refer to the conceptual middle ground between the categories neurosis and \*psychosis. Today the name BPD refers to a personality disorder characterized by a long-standing pattern of instability in various areas, including mood, interpersonal relationships, and self-image. Clinically, BPD is associated with extreme distress, harmful behaviour, and social and/or occupational dysfunctioning. The point prevalence of BPD has been reported as lying around 2% in the community population. In 1980, the diagnostic category BPD made its debut in the third edition of the American Psychiatric Association's *Diagnostic and Statistical Manual of Men-*

*tal Disorders* (DSM-III). As the DSM-III states, "During periods of extreme stress transient psychotic symptoms of insufficient severity or duration to warrant an additional diagnosis may occur". As a consequence, longer-lasting hallucinatory states occurring in individuals with a clinical diagnosis of BPD have often been referred to with somewhat ambiguous terms like \*quasi-hallucination, \*pseudohallucination, \*dissociative phenomenon, and micropsychotic episode. As the Australian psychiatrists Leslie Yee et al. point out, this practice has for a long time obscured the regular occurrence of \*hallucinations proper – as well as the occasional occurrence of \*persistent hallucinosis – in individuals with a clinical diagnosis of BPD. Yee et al. draw attention to the growing literature on \*auditory, \*visual, and \*olfactory hallucinations in association with BPD, suggesting that a significant proportion of the individuals with BPD may experience hallucinations that are not transient but ongoing, not circumscribed but pervasive, and phenomenologically indistinguishable from those in individuals diagnosed with one of the major psychotic disorders.

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### Bottom-Up Hypothesis

A generic name for a group of hypotheses that attribute the mediation of hallucinations primarily to a disorder of the *data-driven* processing of perceptual information, such as may occur in the context of \*deafness, \*blindness (i.e. the \*Charles Bonnet syndrome), \*sensory deprivation, or dysfunction of the primary sensory cortex. The term bottom-up hypothesis is used in opposition to the term \*top-down hypothesis. The latter term refers to a group of hypotheses that attribute the

mediation of hallucinations primarily to a disorder of the *conceptual* processing of perceptual information.

#### Reference

- Aleman, A., Laroi, F. (2008). *Hallucinations. The science of idiosyncratic perception*. New York, NY: American Psychological Association.

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### Bouguer's Halo

see Ulloa circle.

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### Bouncing Vision

see Oscillopsia.

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### Braille Hallucination

see Hallucination in braille.

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### Brain-Damage-Induced Synaesthesia

A term used to denote a type of \*synaesthesia falling into the class of the \*non-idiopathic synaesthesias. Etiologically, brain-damage-induced synaesthesias are associated primarily with lesions affecting the optic nerve, anterior portions of the brain, or the brainstem.

#### Reference

- Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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### Brain Light

see *Eigengrau*.

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### Brainstem Auditory Hallucinosi

A term used to denote a hallucinatory state characterized by \*auditory hallucinations which are

attributed to aberrant neurophysiological activity in the brainstem. The concept of brainstem auditory hallucinosis is analogous to that of \*peduncular hallucinosis, except for the fact that peduncular hallucinations are believed to be mainly visual in nature. Both concepts envisage the top of the brainstem and its surrounding structures as the primary source for certain types of hallucinations. Although relatively scarce, speculations about the involvement of the brainstem in the mediation of auditory hallucinations can be found in the literature from the late 19th century onwards. The first empirical study providing empirical corroboration for this thesis was published in 1986 by the American neurologists George D. Cascino and Raymond D. Adams. Cascino and Adams reported on three individuals suffering from \*nonverbal auditory hallucinations in the form of buzzing, clanging, machine noises, the sound of bells chiming, organ tones, and so on, who showed clinical, radiologic (CT), and in one case pathologic signs of lesions of the tegmentum of the pons and lower midbrain, but no signs of structural lesions in any other part of the auditory system. In all three cases the hallucinations were continuous in nature, and associated with hearing loss due to central lesions. As the authors speculate, these findings suggest that the hallucinations at hand might perhaps be best regarded as \*release phenomena. As a nosological category, brainstem auditory hallucinosis is classified as a specific type of \*hallucinosis syndrome. Because of its emphasis on the involvement of a specific brain structure (i.e. the pedunculus cerebri or one of its surrounding midbrain structures) it can also be classified as a \*topological model of hallucinatory activity.

#### Reference

Cascino, G.D., Adams, R.D. (1986). Brainstem auditory hallucinosis. *Neurology*, 36, 1042–1047.

### Brainstem Hallucination

A term suggested in 1991 by the American neurologist C. Miller Fisher (b. 1910) to replace the older term \*peduncular hallucination. More specifically, Miller proposes to use the term brainstem hallucination as an umbrella term for a category comprising the group of peduncular hallucinations and hallucinations attributed to CNS

structures in the vicinity of the pedunculus cerebri. Fisher motivates this proposal as follows. “Although peduncular hallucinations are a well recognized type it might be preferable to include them in a broader category – *brain stem hallucinations* that would encompass not only peduncular cases proper but also cases in which visual hallucinations are associated with pontine haemorrhage, thalamic haemorrhage, and thalamic infarction.”

#### Reference

Fisher, C.M. (1991). Visual hallucinations on eye closure associated with atropine toxicity. A neurological analysis and comparison with other visual hallucinations. *Canadian Journal of Neurological Sciences*, 18, 18–27.

### Bridget of Sweden (1303–1373)

Born as Birgitta Birgersdotter; also known as Saint Birgitta, Santa Brigida, St. Bridgid of Sweden, and Birgitta of Vadstena. A Swedish nun, mystic, and founder of the Bridgettine Order, who from childhood onwards experienced \*visions of celestial and purgatory scenes. When she was 7 years old, Bridget had a nocturnal vision of a woman in shining clothes sitting on an altar-table, who gave her a crown. She continued to have visions until she was 10. During her forties the visions returned, accompanied by voices which she attributed to God, the devil, or specific individuals. While experiencing these visions she was unaware of herself and her surroundings, suggesting that she may have experienced \*trance states or absences. Occasionally these episodes were preceded by \*cacosmia or \*agathosma, interpreted by some as \*olfactory auras. Possibly she also experienced \*abdominal auras. While the making of a retrospective diagnosis is always a delicate undertaking, Bridget's experiences may well have been \*ecstatic auras (occurring in the context of temporal lobe epilepsy) or \*postictal religious experiences. It has been suggested that in Bridget's case the epileptic seizures were caused by a meningioma. Circumstantial evidence for this hypothesis stems from the presence of an interior indentation, the size of a hazelnut, inside the skull thought to have belonged to Bridget. According to the Swedish anatomist Carl-Herman Hjortsjö (1914–1978), this indentation



may have been caused by a tumour, possibly a convexity meningioma.

#### Reference

Landtblom, A.M. (2004). Did St Birgitta suffer from epilepsy? A neuropathography. *Seizure*, 13, 161–167.

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### Brierre de Boismont's Definition of Hallucinations and Illusions

In 1845 the French alienist Alexandre Jacques François Brierre de Boismont (1797–1881) defined hallucinations and illusions as follows. “We define a *hallucination* as the perception of the sensible signs of the idea; and an *illusion* as the false appreciation of real sensations.”

#### Reference

Brierre de Boismont, A. (1859). *On hallucinations. A history and explanation of apparitions, visions, dreams, ecstasy, magnetism, and somnambulism*. Translated by Hulme, R.T. London: Henry Renshaw.

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### Brobdignagian Hallucination

Also known in the literature in the (misspelled) variants brobdignagian hallucination and brodnigagian hallucination. The term brobdignagian hallucination is indebted to *Brobdignag*, the name of a fictitious country inhabited by huge people, featuring in the novel *Gulliver's Travels* by the Irish poet and author Jonathan Swift (1667–1745). It is used as a synonym for the term \*gulliverian hallucination, i.e. a \*visual hallucination in which disproportionately large human figures are perceived, either in isolation, or against a background of regular proportions. For a more detailed account of this type of hallucination, see the entry Gulliverian hallucination.

#### References

Ey, H. (2004). *Traité des hallucinations. Tome 1*. Paris: Claude Tchou pour la Bibliothèque des Introuvables.  
 Swift, J. (1726). *Gulliver's travels*. London: B. Motte.

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### Brobdignagian Vision

Also known in the literature in the (misspelled) variants brobdignagian vision and brodnigagian vision. The term brobdignagian vision is indebted to *Brobdignag*, the name of a fictitious country inhabited by huge people, featuring in the novel *Gulliver's Travels* by the Irish poet and author Jonathan Swift (1667–1745). It is used as a synonym for the term \*macropsia, i.e. a \*visual illusion in which objects and stimuli in the extracorporeal world are perceived as disproportionately large. For a more detailed account of this type of \*illusion, see the entry Macropsia.

#### References

Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.  
 Swift, J. (1726). *Gulliver's travels*. London: B. Motte.

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### Brocken Bow

The name Brocken bow refers to the Brocken, a peak in the Harz mountains in Germany. It is used as a synonym for the terms glory and \*Ulloa's bow, provided that the latter phenomenon is accompanied by a \*Brocken spectre.

#### Reference

Lynch, D.K., Livingston, W. (1995). *Color and light in nature*. Cambridge: Cambridge University Press.

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### Brocken Spectre

Also known as Spectre of the Brocken and mountain spectre. The name Brocken spectre, or *Brockengespenst* in German, refers to the Brocken, a peak in the Harz mountains in Germany. It is used to denote a \*physical illusion consisting of the observer's disproportionately large shadow projected upon the surfaces of clouds at the horizon facing the rising or setting Sun. The person credited with documenting the phenomenon for the first time, in 1780, is the German theologian and natural scientist Johann Esaias Silberschlag (1721–1791). As noted by Silberschlag and numerous observers after him, both near the



**Fig. 7** Brocken spectre. Source: Flammarion, C. (1873). *The Atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

Brocken peak and in other mountainous regions, Brocken spectres typically arise when a low-lying Sun projects a large shadow into a bank of mist or fog in the distance. The resulting shadow figure may appear to be moving, and strike one as being three-dimensional in shape because of the extent to which the shadow is projected into the fog, and because of the relative movements of separate fog banks. Lending the phenomenon an even more impressive appearance, Brocken spectres can be accompanied by coloured concentric arches or circles, called glories or \*Brocken bows, and a pale outer arch or circle which is called a white rainbow or \*Ulloa circle. These \*halo figures are explained by reference to the interaction of sunlight and droplets of water suspended in the air.

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### Buddha's Halo

Also known as Buddha's light. Both eponyms refer to the corona of light traditionally depicted in images of Siddhārta Gautama, also known as Gautama Buddha (c. 566–486 BC), the founder of Buddhism. The terms Buddha's halo and Buddha's light are used to denote a \*physical illusion consisting of multicoloured, concentric rings of light that can sometimes be seen against a cloud or fog bank in mountainous regions, at a position opposite the Sun (i.e. the antisolar point). Two locations in China famous for the appearance of Buddha's halo are Kanas Lake in Xinjiang Province and Huangshan Mountain in Anhui Province. Buddha's halo is typically described as a colourful circle of light appearing over (or against) a sea of clouds. Because of the sunlight coming from behind, observers can see their own shadow, as well as the shadows of nearby objects and persons, projected upon the cloud. Since they always see their own shadow in the centre of the halo, there is a certain tendency to interpret this as a sign of their own enlightenment. Meteorologists tend to explain atmospheric phenomena

such as Buddha's halo by reference to the interaction of sunlight and droplets of water suspended in the air, having a size smaller than 25 μm radius. Because of its lack of a tangible substratum in the extracorporeal world, Buddha's halo is also classified as a \*fiction illusion. Phenomenologically as well as genetically, Buddha's halo is related to the \*Ulloa circle and \*Ulloa's bow. It should not be confused with \*heiligschein and the aureole effect.

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### Buddha's Light

see Buddha's halo.

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### Bufotenine and Hallucinations

Bufotenine is also known as bufotenin, dimethyl serotonin, 5-OH-dimethyltryptamine (5-OH-DMT), *N,N*-dimethyl-5-hydroxytryptamine, and mappine. The name bufotenine was suggested in 1893 by the French scientists Césaire Auguste Phisalix (1852–1906) and Gabriel Bertrand (1867–1962), and officially introduced in 1920 by the Austrian chemist Hans Handovsky (1888–1959) as the name of a chemical substance isolated by him from toadskin. The name derives from the *Bufo* genus of toads, various species of which secrete a complex mixture of psychoactive substances that includes bufotenine. Bufotenine also occurs in the eggs of toads such as *Bufo alvarius* and *Bufo marinus*, as well as in the Amazonian-Antillean narcotic snuff *Anadenanthera peregrina*, and in some mushrooms, higher plants, and animals. Because of their psychoactive excrements, animals such as *B. alvarius* and *B. marinus* are referred to as \*psychoactive fauna. Although bufotenine was not isolated until 1920, toad secretion has been used as an \*entheogen by shamans and mystics since ancient times. Its toxicity was recorded as early as the first century AD by the Roman

poet Decimus Junius Juvenal (AD 60–128). Today bufotenine is classified as a hallucinogenic tryptamine from the group of indole alkaloids. Its chemical structure, which is related to that of the \*hallucinogens psilocin and dimethyltryptamine (DMT), as well as to that of the neurotransmitter serotonin, was discovered in 1934 by the group of the German chemist and Nobel prize laureate Heinrich Otto Wieland (1877–1957). In 1935–1936 bufotenine was synthesized for the first time by the Japanese chemists Toshio Hoshino and Kenya Shimodaira. Because orally ingested bufotenine is rapidly inactivated by the body's monoamine oxidase (MAO) system, it is usually applied intranasally, intravenously, by inhalation, or in the form of an enema. For recreational use, bufotoxins are also ingested by means of toad licking. For bufotenine to be biologically effective, the latter technique requires the simultaneous use of a MAO-inhibiting substance such as tranlycypromine to prevent a premature inactivation of bufotenine. The hallucinations mediated by bufotenine intoxication are described as predominantly visual in nature.

\*Simple and \*geometric visual hallucinations, in particular, have been reported, as well as \*trailing phenomena and an increased intensity of colours. Intense visual and \*auditory hallucinations have been reported as well, however, commencing seconds after inhaling the smoke of dried toad venom, and lingering on for about 5 min. Traditionally comparisons have been made with the effects of other hallucinogens such as LSD and mescaline, although the effects of bufotenine are reported as being milder, and of a shorter duration. Due to the presence of the other toxins in *Bufo* toad venom and eggs, the oral ingestion of these substances may induce various unexpected side effects. Occasionally it may even result in epileptic seizures, coma, and eventually death.

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# C

## Cacogeusia

The term cacogeusia comes from the Greek adjective *kakos* (bad, unpleasant) and the Latin noun *gustum* (taste). It translates as 'bad taste'. It is used to denote a \*gustatory hallucination or illusion presenting in the form of an unpleasant taste. Cacogeusia is often associated with – and confused with – \*cacosmia. Etiologically, it is associated primarily with diseases of the tongue, oral cavity, oesophagus, and stomach, as well as with disorders of the upper respiratory tract. Cacogeusia may also occur as a side effect of recently ingested food, drinks, therapeutics, or illicit substances. In some cases it can be attributed to central disorders of the gustatory tract. Cacogeusia is classified as one of the \*chemosensory disorders.

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## Cacosmia

The term cacosmia comes from the Greek words *kakos* (bad, unpleasant) and *osmè* (smell, stink, fragrant, odour, scent, perfume). It translates as 'bad smell'. The term cacosmia is used to denote an \*olfactory hallucination or illusion presenting in the form of an unpleasant odour. Some examples of cacosmia are the odours of burning flesh, faeces, garlic, rotting fish, rotting eggs, vomit, and garbage. Cacosmia is often associated with – and confused with – \*cacogeusia. Cacosmia is classified as one of the \*chemosensory disorders. The term is used in opposition to the term \*agathosma (i.e. 'good smell'). When cacosmia takes the form of an \*olfactory hallucination experienced as emanating from the oral cavity, the term \*hallucinated halitosis applies.

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## Café Wall Illusion

A term used to denote a marked wedge distortion that can be observed in horizontal rows of black and white tiles offset by half a tile width in alternating rows (a so-called Münsterberg checkerboard figure), with visible mortar lines in between the horizontal rows. The illusion consists of the horizontal mortar lines appearing as being tilted. The Café Wall illusion was first reported in 1979 by the British psychologists Richard Langton Gregory (b. 1923) and Priscilla Heard. It had been brought to their attention by a member of Gregory's lab, who had observed it at the front of a café (St. Michael's Hill, Bristol, UK) which was adorned with black and white ceramic tiles. The mediation of the Café Wall illusion is attributed to a combination of simple image processing occurring at the retina, and complex pro-

cessing carried out by the cortical cells of striate cortex. The Café Wall illusion is usually classified as a \*physiological illusion.

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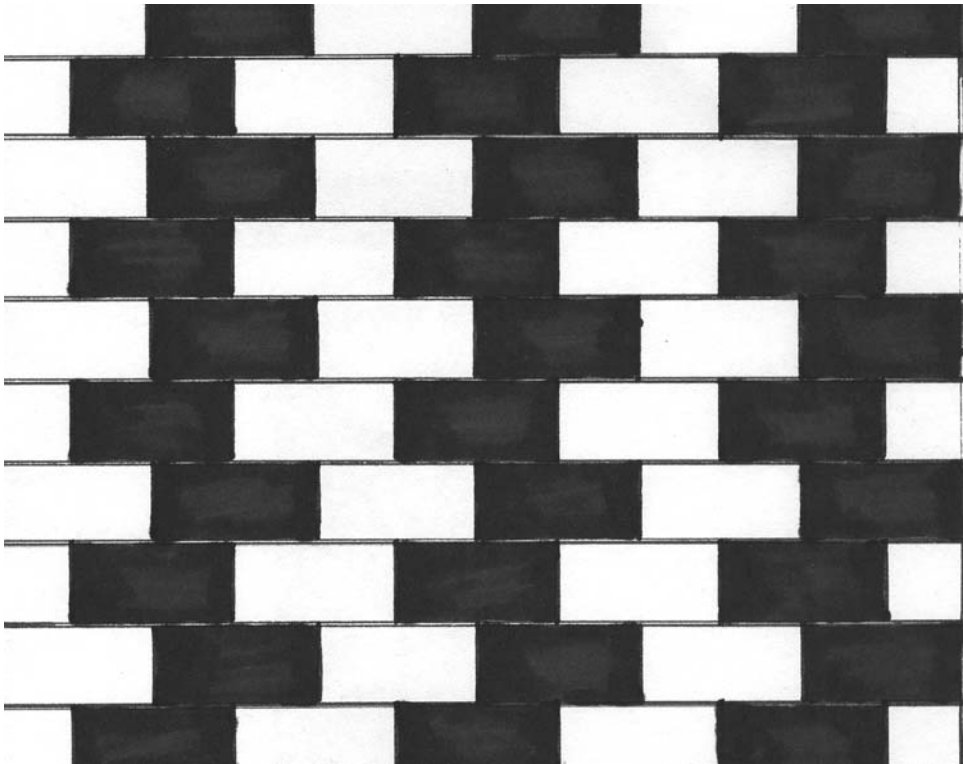
## Cambiata Illusion

see Musical illusion.

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## Cannabis-induced Hallucination

Cannabis and its various products are known under many names, including bhang, canvas,



**Fig. 1** Café Wall illusion. Illustration by JDB

ganja, grass, grifos, \*hashish, Indian hemp, \*kif, \*marihuana, Mary Jane, pot, reefers, skunk cannabis, stick, and weed. The name *cannabis* is Latin for canvas or hemp. It comes from the Greek noun *kánnabis*, which originally may have been a Scythian or Thracian word. It has of old been used to denote three species of herbaceous plants from the *Cannabaceae* family, i.e. *Cannabis sativa*, *Cannabis indica*, and *Cannabis ruderalis*. However, a variety of polymorphous ecotypes and cultivated 'races' are also referred to as cannabis. The leaves and flowers of the pistillate (female) plants of these species contain tetrahydrocannabinol (THC), also known as delta-9-tetrahydrocannabinol and dronabinol. THC is one out of the more than 60 cannabinoids that can be found in cannabis. It is considered the plant's principal psychoactive constituent. Therefore, the concentration of THC is believed to be the main determinant of the strength of cannabis products. THC was isolated from cannabis in 1964 by the group made up of the Israeli scientists Raphael Mechoulam (b. 1930), Yechiel Gaoni, and Habib Edery. The term \*hashish is used to denote a preparation composed of the compressed appendages (or trichomes) collected from the cannabis plant. The terms kif, kief, keef, and kef are used to denote a potent cannabis product obtained by removing the loose, dried trichomes of cannabis from containers or grinders. The term skunk cannabis refers to a potent cross-breed of *C. sativa* and *C. indica*. Cannabis has been used since ancient times as a therapeutic, an \*entheogen, and an aphrodisiac, as well as for recreational purposes. The first scientific reports on cannabis appeared in the 1830s. Arguably the most important work from this early period is the book *Du Hachisch et de l'Aliénation Mentale* by the French alienist Jacques-Joseph Moreau de Tours (1804–1884). It is estimated that today about 4% of the world's adult population use cannabis at least once a year, and that 0.6% use cannabis on a daily basis. Cannabis products are usually administered through smoking. They can also be vaporized, however, or eaten, or drunk in the form of an infusion or tea. The intravenous use of cannabis products is ineffective, and is therefore uncommon. The minimum amount of THC needed to obtain a discernible psychoactive effect lies around 10 µg/kg of body weight. This effect is believed to be mediated via the cannabinoid receptor type 1 (CB<sub>1</sub>), which is distributed throughout the CNS and other parts of the body. This cannabinoid recep-

tor was discovered in or shortly before 1988 by the group of the American molecular pharmacologists William Anthony Devane and Allyn Howlett. The acute effects of cannabis tend to commence several minutes after consumption, reaching their peak some 10–30 min later, and lingering on for several hours. Low doses of THC typically evoke mild euphoria, relaxation, and a disinhibition of social tension. This state is often accompanied by hunger, more specifically a craving for sweets. Other early side effects are thirst, uncontrollable laughter, nausea, vertigo, and dryness of the mouth. Subtle changes in sensory acuity may occur as well (i.e. an increase in the vividness of sight, smell, touch, taste, or hearing), as well as mild formal thought disorders, paranoia, anxiety, and panic feelings. Stronger doses tend to intensify these reactions. The user may experience impairments of concentration and short-term memory, a disorientation in time and place, formal thought disorders, rapid changes of affect, and an altered sense of self-identity. High doses may result in \*metamorphopsias, \*synaesthesias, \*illusions, hallucinations, and \*dissociation. The hallucinations occurring in the context of THC intoxication tend to be \*visual and/or \*auditory in nature. The visual hallucinations are mainly \*simple or \*geometric in nature, although \*complex and even \*compound hallucinations are reported as well. Because cannabis acts via its own unique cannabinoid receptor system, and makes use of a unique neurotransmitter (called anandamide), it is considered to constitute a pharmacological class of its own. In the past, cannabis has been classified variously as a narcotic, a sedative, and a \*hallucinogen. Because of its purportedly weak hallucinogenic properties, cannabis has also been classified as a quasi-psychedelic. It can induce severe hallucinatory states, however, especially when relatively high doses of THC are consumed by an individual not accustomed to such doses, and/or when the individual has a heightened vulnerability for \*psychosis. Cannabis-induced psychosis is believed to be a relatively infrequent complication of cannabis use. As indicated in the early 1990s by the group of the Dutch psychiatrist Don Linszen, cannabis use would seem to be associated with an earlier onset of psychotic symptoms in individuals diagnosed with schizophrenia. However, the exact relation between cannabis use and prolonged or recurrent psychosis (as in individuals with a clinical diagnosis of \*schizophrenia) has not been

established with certainty. A person intentionally employing cannabis for the purpose of exploring the psyche may be called a \*psychonaut.

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### Capgras Delusion

see Capgras' syndrome.

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### Capgras for Arm

see Capgras' syndrome.

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### Capgras for Environment

see Capgras' syndrome.

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### Capgras Syndrome for Persons

see Capgras' syndrome.

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### Capgras Syndrome for the Mirror Image

see Mirror sign.

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### Capgras' Syndrome

Also known as Capgras syndrome, Capgras syndrome for persons, Capgras delusion, \**illusion des sosies*, illusion of doubles, and illusion of false recognition. The eponym Capgras' syndrome refers to the French psychiatrist Jean Marie Joseph Capgras (1873–1950), who has been credited with being the first to describe the concomitant phenomenon in collaboration with his intern Jean Reboul-Lachaux in 1923. It was their French colleague Joseph Levy-Valensi who in 1929 proposed the eponym Capgras' syndrome. Capgras and Reboul themselves referred to this syndrome by the French term *illusion des sosies* (illusion of doubles). Today the term Capgras' syndrome is used to denote a condition characterized by the inability to identify a familiar person, even though one does recognize that person's facial and bodily characteristics. As a result, individuals with Capgras' syndrome tend to believe that the person in question has been replaced by a double (hence the name illusion of doubles). The syndrome is generally regarded as a type of hypo-identification, and classified as one of the \*misidentification syndromes, or, more specifically, as one of the delusional reduplication syndromes. It has also been classified as an agnosia, and as a variant of reduplicative paramnesia (the latter condition being characterized by the affected person's conviction that a familiar place, or object, or person has been duplicated). Because of its association with various psychiatric and neurological disorders, doubts were long expressed about whether Capgras' syndrome deserves the nosological status of a syndrome. As to its pathophysiology, it has been suggested that Capgras' syndrome is associated with bifrontal cerebral cortical atrophy, and with the presence of one or more right parieto-occipital lesions. However, the right fusiform gyrus – which plays an important role in various stages of face recognition – has emerged as a possible candidate for the syndrome's primary neurophysiological correlate. A variant of the Capgras-type misidentification syndrome characterized by the conviction that one's house, or the building in which one currently resides (such as a hospital) has been replaced by a duplicate building, is known under the name Capgras for environment. The term Capgras for arm was introduced by



the American neurologist and psychiatrist Todd Feinberg and his colleague David M. Roane to denote a variant of \*asomatognosia characterized by misidentification of a part of one's body (i.e. an arm).

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or from the age of 6 onwards, after the attacks had subsided.) It has been speculated that Cardan's visions may have been caused by a recurring \*migraine aura without headache. Other possibilities include \*hallucinatory epilepsy (although this condition tends to present in the form of a stereotyped hallucinatory scene, with little variation between subsequent attacks), \*peduncular hallucinations (which can occur in the context of migraine, but also in association with a variety of other conditions), \*closed-eye hallucinations, and \*hypnopompic hallucinations (which would be in keeping with Cardan's observation that his visions would come to him while he was lying awake, waiting until it was appropriate for him to get out of bed).

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## Cardan, Jerome (1501–1576)

Also known as Jeronimo Cardan(o/us), Geronimo Cardan(o/us), Hieronymus Cardano(o/us), Girolamo Cardan(o/us), and Gerolamo Cardan(o/us). Cardan was an Italian lawyer, mathematician, astrologer, and physician who between the ages of three and six experienced paroxysmal \*visions depicting multiple tiny creatures, objects, and scenes perceived solely in the visual modality (i.e. \*complex visual hallucinations, or, more specifically, \*lilliputian and other \*microptic hallucinations). Reportedly, the creatures were perceived as moving swiftly in a semicircle from the right side of the visual field to the left, while the scene as a whole was made up of colourless "images of airy nothingness of body", seemingly consisting of tiny ring-like structures. The figures perceived by Cardan included castles, houses, animals, horses with rider, plants, trees, musical instruments, theatres, men dressed in various costumes, swarming peoples, flowers, fields, groves, forests, and "shapes like unto bodies". Cardan did not experience any other symptoms, except for a perceived coldness of his lower legs, which followed the period of hallucinatory attacks. (It is unsure whether Cardan means that this coldness appeared after each attack,

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## Carroll, Lewis

see Dodgson, Charles Lutwidge.

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## Cataract Delirium

see Black patch delirium.

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## Causalgia

The term causalgia comes from the Greek words *kaiein* (to heat, to set on fire) and *algos* (pain). It was introduced in 1867 by the American neurologist Silas Weir Mitchell (1829–1914) to denote a specific painful condition following injury to one of the major peripheral nerves. Although various definitions of causalgia exist, today the term is used to denote an intolerable, burning pain, usually located in the palm of the hand, the palmar face of the fingers, or the dorsum of the foot, which is accompanied by severe \*hyperaesthesia of the affected region. Causalgia is typically located along the efferent trajectory of a peripheral nerve containing sen-

sory fibres, at some distance removed from a skin lesion or wound that has healed. It can be accompanied by autonomic dysfunction in the form of sudomotor, vasomotor, and trophic skin changes. Although Mitchell recognizes that causalgic pain can also present in the form of a mild burning sensation, he emphasizes its predilection for causing "a state of torture which can hardly be credited". As he asserts, "Perhaps few persons who are not physicians can realize the influence which long-continued and unendurable pain may have on both body and mind. . . Under such torments the temper changes, the most amiable grow irritable, the bravest soldier becomes a coward, and the strongest man is scarcely less nervous than the most hysterical girl. Nothing can better illustrate the extent to which these statements may be true than the cases of burning pain, or, as I prefer to term it, *Causalgia*, the most terrible of all tortures which a nerve wound may inflict." Traditionally causalgia has been divided into two forms, referred to as causalgia major and causalgia minor. The term causalgia major has been used to denote a form of peripheral nerve injury, accompanied by electrophysiological cross-activation, and severe hyperactivity of the sympathetic ner-

vous system. This condition can be complicated by \*hyperpathia, vasoconstriction, and movement disorders. Etiologically, causalgia major is associated with injuries caused by a high-velocity sharp object such as a razor knife, a vibratory-component major trauma (caused by a bullet, for instance), or a high-voltage nerve lesion (as in electrocution). The term causalgia minor has traditionally been used to denote a somewhat similar, but milder symptom complex. The difference between the two forms of causalgia is essentially a question of degree. The incidence rate of causalgia among victims of nerve injuries has been reported as lying between 2 and 20%. Causalgia can be classified as a severe form of reflex sympathetic dystrophy (RSD). In 1993 the International Association for the Study of Pain proposed the new term complex regional pain syndrome (CRPS) as an umbrella term for RSD and causalgia, in order to better reflect the possible nature of these painful conditions. Causalgia, RSD, and CRPS should not be confused with other pain syndromes such as \*allodynia, \*central pain, \*hyperalgesia, hyperpathia, \*phantom pain, \*topalgia, and \*hallucinated pain. The question of whether pain can also be experienced in a hallucinated form is a knotty philosophical issue.

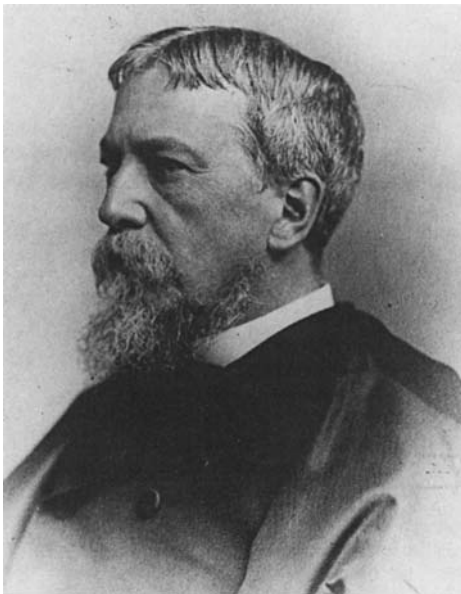


Fig. 2 Silas Weir Mitchell

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### Celestial Illusion

The term celestial illusion is indebted to the Latin noun *caelum*, which means heaven. It is used to denote a group of \*size illusions characterized by an apparent increase in the size of celestial bodies when these are perceived above the horizon (as compared to the way they are perceived in the zenith). This illusion would seem to apply to all celestial bodies, but the most famous examples

of the celestial illusion are the \*Moon illusion, the \*Sun illusion, and a similar, apparently nameless phenomenon pertaining to the perceived distance between the stars in constellations such as the Great Bear and Orion. Celestial illusions have been known since ancient times. They are traditionally regarded as \*physical illusions, i.e. illusions based on the physical properties of the celestial bodies themselves, and/or the surrounding atmosphere. Although today most experts would dispute this, it is still uncertain whether celestial illusions should be regarded as \*physiological illusions, \*cognitive illusions, or – most probably – a combination of the two. For a more detailed account of celestial illusions, see the entry Moon illusion. The notion of celestial illusion should not be confused with the notion of \*autokinetic effect, which refers, among other things, to the illusory motion of stars.

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#### Cellini's Halo

see Heiligenschein.

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#### Cenesthetic Hallucination

see Coenesthetic hallucination.

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#### Census of Hallucinations

Also referred to as Census of Waking Hallucinations. Both titles are used to denote the first large-scale survey of hallucinations in the non-institutionalized population, carried out between 1889 and 1892 by the British Society for Psychical Research (SPR). In 1889 the SPR, represented by the Cambridge moral philosopher Henry Sidgwick (1838–1900), mobilized 410 interviewers in order to investigate 17,000 individuals in the United Kingdom. Reports of \*dreams and other non-hallucinatory phenomena were excluded from the investigation, and Sidgwick's committee also weeded out all dubious cases. The results of

this cross-sectional survey suggested that 9.9% of the non-institutionalized population in the United Kingdom could remember having had one or more hallucinations. As the committee was particularly interested in signs of life from beyond, Sidgwick et al. focused on reports involving individuals who had died within a time frame of 12 hours before or after appearing in one of the participants' hallucinations. After rejecting all accounts in which foreknowledge of the illness or impending death of the person in question could have played a role, the committee was left with 350 first-hand reports of death-related visions. According to the committee, this number was 440 times higher than one would expect on the basis of chance alone. As a consequence, the general conclusion of the committee was that "between deaths and apparitions of the dying person a connexion exists which is not due to chance alone." At the time, similar results had been obtained in Germany by a group headed by Baron Albert von Schrenck-Notzing (1862–1929), in France by the group of Léon Marillier (1862–1901), and in the United States by the American Society for Psychical Research, headed by the philosopher and psychologist William James (1842–1910). The activities of all four groups had been closely followed by the German hallucinations researcher Edmund Parish (1861–1916), who absorbed their preliminary reports as soon as they appeared, and published these in his book *Ueber die Trugwahrnehmung (Hallucination und Illusion)*. Parish's book appeared in 1894, a few months before the SPR's final *Report on the Census of Hallucinations* was published. It contains a meta-analysis of the material from all four groups, indicating that the combined research units had received a total of 27,329 answers from their respective target populations, of whom 11.96% on average were found to be familiar with hallucinations. Subsequent studies, carried out throughout the 20th century, roughly replicated the epidemiological findings of the SPR and their sister organizations, showing that this number had not been exaggerated. What does seem to have changed during the intervening century, however, is the prevalence of \*visual hallucinations (which had been found to be higher in the earlier studies) and \*auditory hallucinations (which had been found to be lower in the earlier studies). This may be a reflection of genuine change, as the American psychiatrist and epidemiologist Allen Y. Tien speculates, but it is also possible that it reflects selection bias

on the part of the SPR investigators. After all, they had been free to select participants from the population at large, and they were known to have a vested interest in tracking down so-called \*veridical or \*coincidental hallucinations involving dead or dying people, which were thought to be mainly visual in nature. The metaphysical implications of the SPR's findings were criticized by Parish, and by many others after him. In present-day scientific references to the Census of Hallucinations they tend to be ignored altogether. However, the SPR's epidemiological findings are still widely cited.

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## Census of Waking Hallucinations

see Census of Hallucinations.

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## Central Achromatopsia

see Cerebral achromatopsia.

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## Central Macropsia

The term central macropsia comes from the Greek words *kentron* (centre of a circle), *makros* (large), and *opsis* (seeing). It refers to a visual distortion in which objects and stimuli are perceived as disproportionately large, but only in the central field of vision. Because objects and stimuli perceived in the periphery of the visual field retain their normal proportions, central macropsia yields an image similar to that perceived through a birds-eye lens. The introduction of

the French term *macropsie centrale* is attributed to the French psychologist Charles Binet-Sanglé (1868–1941). Central macropsia is classified as a variant of \*macropsia, which is in turn classified as a \*metamorphopsia.

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## Central Pain

Also known as thalamic pain, pseudothalamic pain, and \*anaesthesia dolorosa. The term central pain is indebted to the Greek noun *kentron* (centre of a circle). It refers to the central nervous system as the originator of this type of pain. The term central pain was introduced into the English language in 1914 by the American surgeon Richard Joseph Behan (b. 1879). The concomitant concept, however, was introduced in or shortly before 1891 by the German neuroanatomist Ludwig Edinger (1855–1918). Following various descriptions of pain arising in the context of bulbar lesions, spinal hemisection, spinal trauma, and pons tumours – as rendered in the literature since 1811 – Edinger envisaged *central entstehende Schmerzen* (i.e. 'centrally mediated pains') as "caused by direct contact of injured tissue with the sensory path coursing in the internal capsule". According to the Italian pain specialists Sergio Canavero (b. 1964) and Vincenzo Bonicalzi (b. 1956), the use of the terms thalamic pain, pseudothalamic pain, and anaesthesia dolorosa as synonyms for central pain is not entirely correct. Today thalamic pain is conceptualized as a specific form of central pain, whereas the term anaesthesia dolorosa only applies to central pain when there is an anaesthetic region caused by neurosurgical lesions. The term pseudothalamic pain has been discarded altogether. Today central pain is conceptualized as a somatosensory symptom due to a CNS lesion affecting a part of the spinothalamic-parietal path. It is defined by the International Association for the Study of Pain (IASP) as "pain initiated or caused by a primary lesion or dysfunction of the central nervous system". Central pain can be complicated by other non-sensory symptoms such as \*visual and \*auditory hallucinations, vertigo, and cognitive or motor function

abnormalities. Phenomenologically, it is characterized primarily by a segmentally distributed type of pain which is restricted to one or more body parts, such as the hemiface, one foot, one hand, a quadrant of the body, or the mouth and hand. In 40% of cases, the affected individual reports hemibody pain, with or without involvement of the face. The pain is described as having different qualities simultaneously. For example, there may be a burning pain in the leg and an aching pain in the face, or \*dysaesthesia to the hemiface, and shooting pains to the limbs and trunk. Generally speaking, one type of pain tends to be present continuously, while the other tends to be episodic in nature. The intensity of the pain can vary significantly, but it can be so unbearable that the affected individual may consider, or actually commit suicide. When central pain takes the form of an itch, it is referred to as central neurogenic pruritis. Alternatively, central pain can also be characterized by an unpleasant sensation that is not pain or pruritis, and which the affected individual may find hard to describe. Pathophysiologically, central pain is associated primarily with structural lesions affecting the spinothalamoparietal path. Etiologically, it is associated primarily with stroke, neoplasms, and traumata. The notion of central pain should not be confused with pain syndromes such as \*deafferentiation pain, \*hyperalgesia, \*hyperpathia, \*causalgia, \*topalgia, and \*allodynia, or with the notions of \*hallucinated pain and \*hallucinated headache. The issue of whether pain can also be experienced in a hallucinated form is a knotty philosophical issue.

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### Central Tinnitus

A term used to denote a type of \*tinnitus (i.e. ‘ringing in the ears’) attributed to a lesion affect-

ing a part of the central auditory pathways. The term central tinnitus is used in opposition to the terms \*otic (or \*peripheral) tinnitus, and \*somatic tinnitus. As part of a different tripartition, the term central tinnitus is also used in opposition to the terms \*conductive tinnitus and \*sensorineural tinnitus. Today tinnitus tends to be conceptualized as a condition that is mediated and sustained by central neural networks, even though in many cases it would seem to be triggered by peripheral pathology.

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### Centrifugal Theory of Hallucinatory Activity

The centrifugal theory is an explanatory model of hallucinatory activity which is traditionally attributed to the German physiologist and zoologist Johannes Peter Müller (1801–1858). The centrifugal theory suggests that subcortical and/or cortical areas of the brain (or the mind, in a dualist reading) are responsible for mediating the initial impulse for some types of hallucinatory activity, which is then ‘projected outwards’ to produce the false impression of a sensory percept. Historical examples of the ensuing type of hallucination are known under the names \*intuitive hallucination, \*psychic hallucination, and \*sensorial hallucination. In some versions of the centrifugal theory, the efferent impulse is considered to be conducted backwards, i.e. in an afferent direction, by the primary sensory pathways. The Italian psychiatrist Eugenio Tanzi (1856–1934), for example, hypothesizes that the primary sensory pathways possess such a capacity for ‘reversed conductivity’. The centrifugal theory constitutes the conceptual counterpart of the \*centripetal theory of hallucinatory activity.

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## Centripetal Theory of Hallucinatory Activity

The name centripetal theory refers to an explanatory model of hallucinatory activity which is traditionally attributed to the German physiologist and zoologist Johannes Peter Müller (1801–1858). Conceptually, the centripetal theory constitutes the logical counterpart of the \*centrifugal theory of hallucinatory activity. The centripetal theory suggests that the sense organs or the peripheral nervous system must be held responsible for mediating the initial impulse for some types of hallucinatory activity, which is then ‘projected upwards’ towards the higher sensory or ideational centres of the brain (or to the mind, in a dualist reading), to produce the false impression of a sensory percept. A historical example of this type of hallucination is known as \*psychosensorial hallucination. Today a compelling literature indicates that hallucinations can indeed be mediated by aberrant activity of the sensory pathways. These neural structures can be subdivided into the sense organs and the primary sensory pathways. The latter are charged with conducting perceptual information from the sense organs towards the cerebral sensory cortex. Theoretically, hallucinations can be mediated by any component of these trajectories, including the sense organs themselves. Thus instances of \*tinnitus have traditionally been associated with a lesion affecting the vestibular organ (although a central origin is equally possible), \*phosphenes with retinal disease, \*floaters with protein clots inside the vitreous body, and some types of \*metamorphopsia with ablatio retinae. Traditionally, however, biomedicine recognizes only a minority of these phenomena as \*hallucinations proper. Instead, they tend to be relegated to the classes of \*entoptic or otopathic phenomena, or

to the class of \*automatisms as envisaged by the French alienist Jules Gabriel François Baillarger (1806–1891). Percepts most likely to be acknowledged as hallucinations proper are those which arise from the aberrant activity of groups of neurons in and around the primary sensory pathways. Studies of isolated hallucinations in single sensory modalities indicate that these percepts may arise from focal anatomical lesions and/or partial epileptic seizures. Because of their physiological characteristics, the American ophthalmologist David Glendenning Cogan (1908–1993) designates this class of phenomena as the \*irritative form of hallucinatory activity (so as to distinguish it from the \*release form of hallucinatory activity). As each of the sensory pathways serves a single sensory modality, focal pathology is thought to result in hallucinations limited to that specific modality. It has traditionally been assumed that the complexity of the resulting phenomena correlates with the function of the brain area involved. Thus lesions in the relative proximity of the sense organs have been associated primarily with the mediation of \*simple or even \*incomplete hallucinations, such as \*ophthalmopathic hallucinations manifesting in one of the hemifields in ocular disease, or \*unilateral auditory hallucinations in lesions affecting one of the acoustic nerves. Circumscribed lesions within the primary sensory cortex of the occipital lobe are typically associated with simple visual hallucinations such as phosphenes, \*fortifications, and other geometric patterns. A well-known example is the \*aura that may precede or accompany a migraine attack. In general, it is believed that lesions in and around the primary sensory pathways are capable of evoking little more than unvarying, stereotypical hallucinations. However, this situation can change when damaged tissue starts to recover, or when partial epileptic activity spreads to other anatomical loci.

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### Cerebral Achromatopsia

see Achromatopsia.

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### Cerebral Akinetopsia

see Akinetopsia.

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### Cerebral Amblyopia

The term cerebral amblyopia is indebted to the Greek noun *amblyōpia*, which means weakness of vision. It refers to a variant of \*amblyopia, or diminished visual acuity, attributed to a lesion affecting the retrochiasmal part of the visual system. In cerebral amblyopia, the ability to see stationary light stimuli is affected, whereas the ability to perceive moving light stimuli within the scotomatous field remains intact. This dissociative phenomenon is known as \*Riddoch's phenomenon. When the loss of vision in cerebral amblyopia affects both visual hemifields, the term bilateral hemiambyopia is used. When only one of the visual hemifields is affected, the term unilateral hemiambyopia applies. Cerebral amblyopia constitutes the conceptual and phenomenological counterpart of \*akinetopsia.

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### Cerebral Dyschromatopsia

A term used to denote a variant of the group of \*colour-processing deficits characterized by a diminished or residual type of colour perception.

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### Cerebro-Sensorial Hallucination

The French neologism *hallucination cérébro-sensorielle* was proposed in or shortly before 1884 by the French psychologist Alfred Binet (1857–1911) as a substitute for the term \*psychosensorial hallucination. The latter term had been previously introduced by the French alienist Jules Gabriel François Baillarger (1806–1891) to denote a type of hallucination mediated by an interplay between the sense organs and the imagination. As Binet points out, Baillarger's term would seem to suggest that in hallucinations a psychological or mental element is related to the sensorial, similar to the way the soul, in a dualist reading, is related to the body. In Binet's view, this rendition suggests that mental and physical conditions belong to mutually independent ontological categories, and that sensations do not fall into the class of mental events. As Binet argues, "This point of view is obviously untenable; the psychic element of hallucinations depends, equally intimately as the sensorial element, on physiological conditions from which they cannot be separated. To avoid a metaphysical discussion of this subject, it would be preferable to call hallucinations a cerebro-sensorial phenomenon."

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### Cessation of Dreaming

see Charcot–Wilbrand syndrome.

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### Change Blindness

A term used since the 1970s to refer to the relatively poor ability of humans to detect large changes to a visually perceived object or scene. Experiments making use of manipulated photographs, motion pictures, live interactions, and other media indicate that unless a change to a visual scene produces a localizable change at a

specific position on the retina, humans tend to have difficulty detecting this change. The notion of change blindness can perhaps be illustrated best by reference to a classic experiment conducted by the American psychologists Daniel J. Simons and Daniel T. Levin, in which unsuspecting pedestrians were approached by a researcher asking for directions. During the ensuing verbal exchange, two other researchers carrying a door passed between them, blocking the pedestrian's view, and allowing the first researcher to swap places with one of the researchers carrying the door. Thus the pedestrian, having begun a conversation with one person, is interrupted, after which he continues his conversation with a different person. The extraordinary nature of this exchange notwithstanding, it was found that some 50% of the subjects failed to detect the switch. Based on findings like these, it has been suggested that the human perceptual system preserves relatively little visual information in between views of a single scene, especially when the interruption takes the form of saccadic eye movements, blinks, blank screens, movie cuts, or other artificial transitions. In addition, it has been suggested that detailed visual representations are not stored in the memory as observers go from one view to the next. It is not clear who coined the term change blindness, but the American psychologist George W. McConkie, who during the late 1970s studied changes made to words and texts during periods of saccadic eye movement, is generally acknowledged as one of the earliest pioneers of the research on change blindness. Conceptually and phenomenologically, change blindness is related to \*inattentive blindness, \*repetition blindness, \*inattentive deafness, \*auditory deafness, and \*tactile insensitivity. On the basis of psychological and philosophical studies in areas such as these a new brand of scepticism has been developed (see the entry Grand illusion argument).

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## Charcot–Wilbrand Syndrome (CWS)

Also known as defective revisualization and irremembrance. The eponym Charcot–Wilbrand syndrome refers to the French neurologist Jean-Martin Charcot (1825–1893) and the German neuro-ophthalmologist Hermann Wilbrand (1851–1935). It is used to denote a combination of visual agnosia (i.e. the inability to make sense of visual images and to revisualize images) and a reported global cessation of \*dreaming. Etiologically and pathophysiologically, CWS is associated primarily with deep bilateral lesions of the occipital lobe. The syndrome's conceptualization is based on two individual case reports, one by Charcot in 1883 and one by Wilbrand in 1887. Charcot's case report involves a person's acquired inability to consciously conjure up the visual mental images of dreams, in association with a deficit in revisualization during wakefulness. Wilbrand's account involves a reported global cessation of dreaming, in association with prosopagnosia (i.e. 'face blindness') after infarction of the occipitotemporal region. Only a small number of reports on CWS can be found in the literature. In 2004 the Swiss neurologists Matthias Bischof and Claudio Bassetti reported a case of CWS in a 73-year-old woman who had suffered from acute, bilateral occipital artery infarction (including the right inferior lingual gyrus). Today the eponym CWS is generally used to denote any loss or reduction of dreaming or its imagery.

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## Charles Bonnet Syndrome (CBS)

The eponym Charles Bonnet syndrome (CBS) refers to the Swiss naturalist and philosopher Charles Bonnet (1720–1792). It was introduced in 1936 by the Swiss neurologist Georges de Morsier (1894–1982) to denote a hallucinatory state or syndrome characterized by \*visual hallucinations occurring in “senile syndromes with ocular lesions”, or, as de Morsier rephrased it in 1938, “in the elderly with intact cognition”. Historically, the eponym CBS has variously been used to denote (1) visual hallucinations occurring in the cognitive intact elderly, (2) visual hallucinations occurring in the context of eye disease, and (3) visual hallucinations occurring in the presence of preserved insight. The syndrome that was later to be named CBS was first described in 1760 by Bonnet, whose grandfather Charles Lullin suffered from this type of hallucinations. As rendered by Bonnet in his book *Essai Analytique sur les Facultés de l’Âme*, Lullin had suffered from loss of visual acuity due to a bilateral cataract. Eight years after a first cataract operation (and 1 year after a second operation, after which his visual

acuity had become even worse), Lullin reported seeing vivid images of scaffolding and brickwork patterns, a multitude of particles (“atoms”) whirling about, clover patterns covering the walls and furniture, as well as people, birds, carriages, buildings, and other objects. According to Bonnet these images were not accompanied by hallucinations in any of the other sensory modalities. Nor did Lullin, a retired magistrate, show any signs of cognitive impairment. Reportedly, Lullin was well aware that his visions were “fictions” of his brain, and showed himself intrigued and amused by them. Near the end of his life, Bonnet’s own visual acuity deteriorated as well, after which he, too, began to experience visual hallucinations. The hallucinations occurring in CBS have also been referred to as \*ophthalmopathic hallucinations, and as \*positive spontaneous visual phenomena (PSVP). Their complexity can range from \*simple or \*geometric to \*complex, although the operational definition of CBS, as issued by the psychiatrists Jorge Manuel Ribeiro Damas-Mora et al. in 1982, requires the presence of complex visual hallucinations. Due to their \*xenopathic character, hallucinations occurring in the context of CBS tend to have a highly realistic appearance. However, individuals in possession of proper reality monitoring strategies usually recognize the hallucinations at hand as non-sensory percepts. Their onset can be at any age, although CBS has been found to be most prevalent at old age. Estimates as to the prevalence of CBS among elderly individuals with impaired visual acuity range from 10 to 30%. Risk factors for the development of CBS include such conditions as poor visual acuity due to corneal degeneration, age-related macular degeneration, glaucoma, and cataract, as well as solitude, fatigue, poor general physical health, and the use of beta blockers. CBS can also occur in association with partial disturbances of vision such as \*hemianopia, \*quadrantanopsia, central scotoma, and \*amblyopia, as well as in temporary disturbances of vision (i.e. \*amaurosis fugax). Visual hallucinations occurring in the context of hemianopia or quadrantanopsia tend to manifest themselves in the impaired visual field, but they can also present in the intact field of vision. Pathophysiologically, the hallucinations concomitant to CBS tend to be regarded as falling into the class of \*release hallucinations, i.e. hallucinations mediated by spontaneous electrophysiological activity originating from subcortical brain areas such as the thalamus, the pedunculus cerebri, and the limbic



**Fig. 3** Charles Bonnet. Engraving by Ambroise Tardieu, 1827

system. A competing explanatory model, known as the \*deafferentation hypothesis, attributes the mediation of hallucinations in CBS to the increased excitability of the visual pathways and/or the visual cortex, due to a lack of inhibitory afferent impulses. Brain regions considered capable of mediating spontaneous visual percepts include the retina, the lateral geniculate nucleus, the primary visual cortex, and the visual association cortex. Conceptually as well as phenomenologically (and perhaps pathophysiological as well), visual hallucinations occurring in the context of CBS appear to display some overlap with \*bereavement hallucinations and \*phantom vision. A variant of Charles Bonnet syndrome was reported in 1953 by the American neurologist and psychiatrist Walter Jackson Freeman (1895–1972) and his colleague Jonathan M. Williams, which involved visual \*hallucinations in braille experienced by a virtually blind woman. In occultism and mysticism, individuals suffering from CBS are sometimes referred to as ‘Bonnet people’, and their capacity to hallucinate as ‘a portal to a parallel reality’.

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## Charpentier's Illusion

Also known as size-weight illusion and \*Demoor's sign. The eponym Charpentier's illusion refers to the French ophthalmologist and physiologist Augustin Charpentier (1852–1916), who has been credited with being the

first to describe the phenomenon, complete with appropriate experimental evidence, in 1891. The eponym Demoor's sign refers to the Belgian physician Jean Demoor (1867–1941), who employed the concomitant phenomenon as a diagnostic test in children with developmental disorders. The eponym Demoor's sign was coined in or shortly before 1903 by the Swiss neurologist and child psychologist Édouard Claparède (1873–1940). The three terms above are used interchangeably to denote the illusory difference in weight experienced when two containers of the same weight, but of different size, are lifted up simultaneously. In the ensuing illusion, the smaller container is experienced as heavier than the bigger one. Charpentier sought to explain the size-weight illusion by referring to a neurophysiological model of weight perception, and a psychological model pertaining to the “feeling of mental effort”. Even today, the debate continues as to which of these two factors should be granted primacy. Charpentier's illusion tends to be classified as a \*physiological illusion. Sometimes the eponym Charpentier's illusion is also used as a synonym for \*autokinetic effect.

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## Chemosensory Deficits

see Chemosensory disorders.

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## Chemosensory Disorders

Also known as chemosensory deficits and disorders of taste and smell. Traditionally, the group of chemosensory disorders is divided into six

broad categories of taste disorders and five categories of smell disorders. The group of taste disorders comprises ageusia, hypogeusia, \*dysgeusia, \*hypergeusia, \*parageusia, and taste agnosia. The group of smell disorders comprises anosmia, hyposmia, \*dysosmia (also referred to as \*parosmia), \*hyperosmia, and smell agnosia. The history of taste and smell research, however, yields a rich legacy of additional terms, such as \*gustatory hallucination, \*olfactory hallucination, \*phantosmia (which tends to be used as a synonym for olfactory hallucination), \*cacosmia (bad smell), coprosma (the smell of faeces), \*agathosma (good smell), crocosmia (the smell of saffron), and diosma (heavenly or divine smell). Etiologically, the chemosensory disorders are associated with a wide variety of conditions, including normal ageing, poor oral hygiene, Alzheimer's disease, local or general medical conditions such as rhinitis, oral candidiasis, nasal polyps, and influenza, as well as the use of certain therapeutics and illicit substances. Pathophysiologically, the chemosensory disorders are associated with one of three major types of losses, referred to as transport losses, sensory losses, and neural losses. The term transport loss refers to the obstruction of chemical stimuli before these can reach the peripheral taste or smell receptors. Sensory losses are those attributed to damage to the sensory organs themselves. This damage may be caused by a variety of conditions, mechanisms, and substances, including therapeutics, toxic chemicals, radiation therapy, neoplasms, and viral infections. Neural losses are those resulting from damage to the peripheral and/or central neural pathways, including the cortical taste area, and the part of the temporal (primitive) cortex involved in the mediation of smell. Known causes of neural loss include head trauma, neoplasms, and neurosurgical procedures. The term sensori-neural loss is used when a clear distinction between a sensory and neural involvement cannot be made with certainty.

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### Chessboard Design

Also referred to as lattice, fretwork, filigree, honeycomb, and grating. All six terms were introduced in or shortly before 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) as more or less synonymous terms denoting one of the four \*form-constants of \*geometric visual hallucinations occurring during the initial stages of mescaline intoxication. Klüver uses the term form-constant to denote certain visual forms and elements which in his view “appear in almost all mescal visions”. As he maintains, “many ‘atypical’ visions are upon close inspection nothing but variations of these form-constants.” The examples of the chessboard design given by Klüver, based on the observations of different test persons, are rendered by him as follows. “‘Soon there grew up an extremely beautiful architecture before my eyes. Hexagonal small honeycombs hung down from the ceiling...’; ‘stripes which formed a sort of fretwork...’; ‘somewhat later I saw shadow-like gratings...’; ‘incessant play of filigreed colors...’; ‘in the face of B., I saw a lattice of yellow-greenish horizontal stripes...’; ‘ornamental fretwork’.” Klüver designates the remaining three form-constants as \*cobweb figure, \*tunnel, and \*spiral.

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### Childhood and Hallucinations

Hallucinations occurring during childhood have been reported in both clinical and nonclinical populations. Arguably the most intriguing type of hallucination reported in 13–22% of healthy children around 4 years of age, and in about 45% of children between 5 and 12 years of age, is the \*imaginary companion. Imaginary companions tend to take the form of \*compound hallucinations. They are described by the children who experience them as other creatures: children, fairy tale characters, television characters, and toy animals, all with definite perceptual characteristics. In a population-based cross-sectional

study of hallucinations experienced by older children and adolescents (i.e. in the age group of 11 through 21 years) 9% reported having had one or more isolated \*auditory hallucinations, 6% isolated \*visual hallucinations, and 7% compound (i.e. auditory plus visual) hallucinations. Much higher prevalence rates of hallucinations are found in clinical populations of children and adolescents. Some examples of clinical disorders associated with a markedly raised prevalence rate of hallucinations are thyroid disease, parathyroid disease, porphyria, Wilson's disease, encephalitis, \*meningitis, leprosy, migraine, epilepsy, Tourette's syndrome, and velo-cardio-facial syndrome. Moreover, a substantially higher prevalence rate of hallucinations is seen in children and adolescents with a clinical diagnosis of \*schizophrenia, mood disorders, or anxiety disorders. The predictive value of hallucinations occurring in childhood or adolescence is a complex issue, but overall, empirical studies would seem to suggest that most of these hallucinations are transient in nature, and that only a minority of cases tend to develop into a major \*psychotic disorder. However, an increased likelihood ratio was found for the development of depressive disorder, \*post-traumatic stress disorder, substance use disorder, and social phobia later in life.

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### Childhood Trauma and Hallucinations

An early hypothesis formulated by the Austrian founder of psychoanalysis Sigmund Freud (1856–1939) suggests that hallucinations can be best understood as re-experiences of childhood trauma. Freud later abandoned this hypothesis in favour of his wish-fulfillment theory of hallucinations, but the hypothesis of a possible relation between hallucinations and childhood physical or sexual trauma was revisited by various groups of researchers from the 1980s onwards. As summarized by the Dutch hallucination experts Marius Romme (b. 1934) and Sandra Escher (b. 1945), studies carried out among voice hearers with a clinical diagnosis of \*schizophrenia or a related psychotic disorder indicate that 70–98% of the individuals with these diagnoses have a history of emotional neglect, physical abuse, and/or sexual abuse. An analysis of the relationships between types of abuse and specific psychotic symptoms carried out by the New Zealand psychologists John Reid and Nick Argyle suggests that hallucinations may be more prevalent than delusions or formal thought disorder among individuals with a history of incest or other types of sexual abuse, while delusions may be more prevalent in those with a history of physical abuse. A retrospective study carried out by the Dutch psychologist Bernardine J. Ensink (b. 1951) among 97 women with a history of sexual abuse by older family members or family friends yields a lifetime prevalence of 34% for hallucinatory \*flashbacks, of 42% for \*visual hallucinations, and of 43% for \*auditory hallucinations. Although the operationalization of terms such as emotional neglect, physical abuse, and sexual abuse is not univocal across these various studies, and studies of this kind may be somewhat flawed by false memories or so-called \*hallucinations of memory, the prevalence rates reported in these studies indicate that childhood trauma as a pathoplastic and possibly pathogenetic factor in the mediation of certain types of hallucinations may be a severely underexposed issue.

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### Childhood Companion

see Imaginary companion.

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## Chloropsia

The term chloropsia comes from the Greek words *chlōros* (green) and *opsis* (seeing), and translates to ‘green vision’. It is used to denote a \*chromatopsia (i.e. a temporary aberration in colour vision) in which all objects and visual stimuli appear to be tinged with green. Chloropsia is usually classified as an \*entoptic phenomenon. Etiologically, it is traditionally associated with digitalis intoxication. The term chloropsia is used in opposition to the terms \*cyanopsia (blue vision), \*xanthopsia (yellow vision), \*erythroptopsia (red vision), and \*ianothinopsia (violet or purple vision).

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## Choreomania

see Dancing mania and hallucinations.

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## Chromatic Illusion

see Musical illusion.

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## Chromatic-Graphemic Synaesthesia

see Coloured language.

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## Chromatic-Lexical Synaesthesia

see Coloured language.

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## Chromatic-Numeric Synaesthesia

see Coloured language.

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## Chromatic-Phonemic Synaesthesia

see Coloured language.

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## Chromatism

The term chromatism comes from the Greek noun *chrōma* (colour). It is used in \*synaesthesia research to denote a hallucinated colour, or coloured light, evoked by a sensory percept experienced in one of the other sensory modalities. Thus a visually hallucinated patch of yellow light following the taste of spaghetti is referred to as a taste chromatism. Other examples of chromatisms are tactile chromatism, sound chromatism, \*coloured language, and \*coloured music.

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## Chromatopsia

Also referred to as chromopsia. Both terms stem from the Greek words *chrōma* (colour) and *opsis* (seeing). They are used to denote a temporary aberration in colour vision, characterized by an excessive sensitivity to one particular colour. As a result, individuals with chromatopsia perceive white objects and stimuli as coloured, and some coloured objects and stimuli as tinged. Traditionally, the group of chromatopsias is divided into \*cyanopsia (blue vision), \*chloropsia (green vision), \*xanthopsia (yellow vision), \*erythroptopsia (red vision), and \*ianothiopsia (violet or purple vision). Pathophysiologically, the group of chromatopsias is divided into central (i.e. cerebral),

retinal, and optical variants. Chromatopsias associated with cerebral cortical lesions or processes are also referred to as \*coloropsia. Etiologically, central chromatopsia is associated primarily with head trauma, cerebrovascular disorders, psychiatric disorders, and intoxications. They tend to arise and disappear quite suddenly. They can be either monocular or binocular in nature, and they can be occasionally present in the form of a coloured \*flicker-scotoma. Chromatopsia of a retinal origin is associated primarily with changes in the macular area, due to macular oedema or central serous retinopathy, for example. Some types of retinal chromatopsia may be due to systemic digitalis or tridione intoxication. Chromatopsias of optical origin are associated primarily with corneal opacities, cataract, vitreous haemorrhage, fluorescein angiography, and icterus. Conceptually and phenomenologically, chromatopsia should not be confused with \*colour vision deficiency or \*colour-processing deficits.

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## Chromopsia

see Chromatopsia.

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## Chronic Hallucinosi

The expression chronic hallucinosi refers to a subtype of \*hallucinosi characterized by delusional and hallucinatory states of a protracted, and often permanent nature. It was employed at least as early as 1900 by the German neurologist Carl Wernicke (1848–1904). The term chronic hallucinosi is used in opposition to the expression \*acute hallucinosi, which refers to a state which is similar but of a limited duration. As a nosological category, chronic hallucinosi is classified as a specific type of \*hallucinosi syndrome.

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## Chronic Tactile Hallucinosi

The expression *chronische taktile Halluzinose* was proposed in 1954 by the German neurologist and psychiatrist Klaus Conrad (1905–1961) and his colleague N. Bers to denote a syndrome characterized by \*formicative hallucinations, parasitic or other dermatozoic delusions, and a chronic course. Conrad and Bers were under the impression that chronic tactile hallucinosi was most prevalent among women of 50 years of age and older. As a nosological category, chronic tactile hallucinosi is classified as a specific type of \*hallucinosi syndrome.

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## Cinematographic Vision

The term cinematographic vision is indebted to the Greek words *kinèma* (movement) and *graphein* (to draw, to write, to etch, to paint). It was introduced in or shortly before 1970 by the British neurologist Oliver Wolf Sacks (b. 1933) to denote a transient type of \*akinetopsia, i.e. a transient and selective deficit in the ability to perceive motion. An individual experiencing cinematographic vision typically perceives scenes as a rapidly flickering series of 'stills', as in a slide show, a kaleidoscope, or a dvd in fast-forward mode. In 1928 the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) presented an apt example of cinematographic vision *avant la lettre* when he wrote, "A person walking downstairs is only seen at three different places of the staircase. Thus the continuous movement of an object is inferred from the successive appearance of this object at different places. A person moving his hand to his face may see it at the beginning and at the end of

the movement. Moving clouds may appear successively at different places. Under certain conditions, the moving object appears simultaneously at different places." Klüver's example is based on observations made during an experiment with the \*hallucinogen mescaline. Etiologically, cinematographic vision is associated primarily with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine or epilepsy. Sometimes it can also be induced artificially with the aid of \*hallucinogens such as LSD and mescaline, as in the example given by Klüver. The phenomenon has also been reported by individuals with a clinical diagnosis of \*schizophrenia. When occurring in the context of a \*migraine aura, the rate of flickering of the 'stills' is believed to be 6–12 per second, i.e. comparable to the rate of scintillation of \*scotomata and \*paraesthesiae in migraine. A return to normal vision is typically preceded by an increase in the rate of flickering. Although the pathophysiology of cinematographic vision is basically unknown, it is not unthinkable that there may be a parallel with the pathophysiological substrate of akinetopsia. Cinematographic vision is classified as a \*sensory distortion. It should not be confused with \*time distortions such as \*tachypsychia, in which movements are perceived either as extremely slow or as extremely fast, due to an alteration in the perception of time.

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### Circle of Ulloa

see Ulloa circle.

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### Clairaudience

The term clairaudience comes from the French words for hearing clearly. The term is used

in the parapsychological literature to denote a \*verbal or \*nonverbal auditory hallucination that is attributable to a metaphysical source, and is therefore interpreted as a \*telepathic, \*veridical, or at least \*coincidental hallucination.

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### Clairsentience

The term clairsentience comes from the French words for feeling clearly. The term is used in the parapsychological literature to denote a \*tactile or \*somatic hallucination attributable to a metaphysical source. It is therefore interpreted as a \*telepathic, \*veridical, or at least \*coincidental hallucination.

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### Clairvoyance

Also known as lucidity, telesthesia, and cryptesthesia. *Clairvoyance* is French for seeing clearly. The term is used in the parapsychological literature to denote a \*visual or \*compound hallucination attributable to a metaphysical source. It is therefore interpreted as a \*telepathic, \*veridical, or at least \*coincidental hallucination.

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## Classification of Hallucinations

Hallucinations are classified in a multitude of ways. As in all classifications, the resulting arrangements are subordinate to the purpose of the classification at hand, and to the guiding

principles involved. An implicit purpose of psychiatric classification tends to be the delineation of groups of signs and symptoms endowed with a similar pathophysiology, endowed with a similar etiology, and/or requiring a similar therapeutic approach. The 19th-century British physician and Professor of medical jurisprudence Henry Maudsley (1835–1918) advocates the view that all classifications in psychiatry should be based on etiology. However, the history of psychiatry demonstrates that that aim has seldom been realized. A less ambitious goal of classification is to organize the area of interest, for example, as a means of enhancing communication. Starting from the general class of \*perceptual disturbances, which comprises the groups of \*sensory deceptions and \*sensory distortions, hallucinations are classified as a variant of the group of sensory deceptions. Arrangements of types of hallucinations are legion. Using the supposed location of the initial impulse of hallucinatory activity as a guiding principle, they are traditionally subdivided into those of a \*centrifugal nature (i.e. hallucinations mediated primarily by the higher sensory areas of the brain, or, in a dualist reading, mediated by the mind), and those of a \*centripetal nature (i.e. hallucinations mediated primarily by the sense organs or the peripheral nervous system). Using the involvement of sensory percepts as a guiding principle, a somewhat crude dichotomy has been constructed of \*illusions and hallucinations (both belonging to the group of sensory deceptions). Arguably the most common way to classify hallucinations is an arrangement in accordance with the sensory modality involved. Traditionally the human \*perceptual system is deemed to have five sensory modalities: olfactory, gustatory, visual, auditory, and tactile. However, this classification is not exhaustive. Hallucinations can also manifest in the form of somatic sensations (i.e. bodily sensations that would seem to come from within the body), vibrations, sensations of heat or cold, kinaesthetic sensations, proprioceptive sensations, feelings of sexual arousal (as in the \*persistent sexual arousal syndrome), and the experience of time (as in \*time distortions). It is debatable whether feelings of pain should be included as well (as in \*hallucinated pain and \*hallucinated headache, for example). Using context as a guiding principle, a historical tripartite division of hallucinations has been made, which consists of \*dreams (i.e. ‘hallucinations’ occurring during sleep), \*delirium, and hallucinations proper. The

idea of a continuum between these states is sometimes attributed to ancient schools of thought, but the question of whether the ancients understood this kinship in a literal or metaphorical sense has yet to be settled by historians of psychiatry. For all we know, the German philosopher Immanuel Kant (1724–1804) may have taken the relation quite literally, as witness his famous dictum that “the madman is a waking dreamer”. It would seem that 19th-century medicine took up this notion and expanded it in the direction of a worked-out theory of non-sensory perception. Thus the French classical scholar and dream researcher Louis-Ferdinand-Alfred Maury (1817–1892) suggests that the false perceptions of dreams, delirium, and hallucinations proper may well have a common origin. Using the *vigilance state* as a guiding principle yields a somewhat different tripartition, consisting of \*hypnagogic hallucinations (occurring at the moment of falling asleep), \*hypnopompic hallucinations (at the moment of waking up), and hallucinations proper (occurring during the waking state). Applying the guiding principle of *complexity* yields a subdivision into \*elementary, \*organized, \*geometric, \*complex, and \*compound hallucinations. Elementary hallucinations are simple phenomena that confine themselves to a single sensory modality. They typically lack persistence and complexity. Some examples of elementary hallucinations are \*photopsias, transient \*paraesthesias, odours, and tastes, and sounds like humming, ticking, and coughing. It may be tempting to attribute the origin of these phenomena to peripheral neuronal discharges, but empirical studies indicate that they can also be mediated by central structures. Organized hallucinations are more complex in nature, ranging from simple geometrical patterns (or tunes, in the auditory modality) to full-colour, three-dimensional images (or symphonies). But they still confine themselves to a single sensory modality. The term complex hallucination is used to denote hallucinated symphonies, three-dimensional images, etc. Hallucinations occurring in more than one sensory modality at a time are referred to as compound or multimodal hallucinations. These latter phenomena can range from the combined sight and smell of a rose, to a full-blown imitation of everyday experience in all of the sensory modalities at once. On occasion, it is even possible for hallucinations to replace the entire sensory input, thus constituting a totally different reality for the individual affected. Such instances are referred to as \*panoramic, \*scenic,



or \*dissociative hallucinations. Obviously, classifications of hallucinatory phenomena are not mutually exclusive. A hallucinated command, for example, can at once be identified as a \*verbal auditory hallucination, a \*command hallucination, a complex hallucination, a compound hallucination (when co-occurring with a visual hallucination of the person giving the command, for example), a \*brainstem hallucination (when attributed to aberrant neurophysiological activity in the brainstem), a \*hypnagogic hallucination (when occurring during the intermediate state between wakefulness and sleep), a \*synaesthesia (when occurring in reaction to a sense perception experienced in any of the other sensory modalities), and an illusion (when an actual voice is heard but misunderstood). Some examples of hallucinations defined with regard to their etiology or pathophysiological substrate are \*peduncular hallucinations, \*brainstem auditory hallucinosis, \*alcoholic hallucinosis, and cannabis-induced hallucinations.

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## Clérambault Syndrome

see De Clérambault syndrome.

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## Clinical Lycanthropy

Also known as lycanthropy and lycomania. The term clinical lycanthropy comes from the Greek words *klinikos* (pertaining to a bed), *lukos* (wolf),

and *anthrōpos* (man). It is used to denote the delusional conviction that one has become a wolf or has the potential to become a wolf. The adjective 'clinical' serves to distinguish this delusion from lycanthropy as described in mythology, i.e. a metaphysical affliction in which people are believed to physically metamorphose into wolves (i.e. into lycanthropes or werewolves) and back again into their human form. In a broader sense, the term lycanthropy is used to denote the delusional conviction that one can be – or has been – transformed into an animal, and/or the display of animal-like behaviour suggesting such a conviction. However, the proper generic name for this latter type of delusion would then be therianthropy or zoanthropy. Clinical lycanthropy is an extremely rare condition, with only about 30 reported cases in the literature of the past 25 years. In clinical practice it tends to be diagnosed either as \*schizophrenia, bipolar disorder, or depression, depending on the accompanying signs and symptoms. Although strictly speaking clinical lycanthropy is a delusional rather than a hallucinatory condition, it can in some instances co-occur with \*hypercoenesthesiopathy, a condition characterized by an increased or hypertrophied feeling of bodily awareness, or with \*paracoenesthesiopathy, a condition characterized by a qualitatively altered feeling of bodily awareness. The latter two conditions are neurological syndromes associated with lesions affecting one or more parts of the parietal cortex involved with embodiment and corporeal awareness (more specifically, the premotor cortex). Incidentally, as early as 1584 the British author Reginald Scot (c. 1538–1599) maintained that "lycanthropia is a disease and not a transformation".

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## Closed-Eye Hallucination

Also known as closed-eye visual hallucination and closed-eye visualization. All three terms are used to denote a type of \*visual hallucination experienced exclusively when the eyes are closed or when there is perfect darkness around. Some examples of phenomena classified as closed-eye hallucinations are \**Eigengrau* (i.e. a type of \*visual noise), the \*fiery rings of Purkinje, \*hypnagogic and \*hypnopompic hallucinations of a visual type, (some types of) \*hallucinogen-induced \*geometric hallucinations, and visual hallucinations occurring in the context of \*sensory deprivation. Although *Eigengrau* and the fiery rings of Purkinje are classified more appropriately as \*physiological illusions or \*entoptic phenomena, they are commonly included in the group of closed-eye hallucinations as well. As to the pathophysiology of closed-eye hallucinations, a certain analogy has been suggested with the \*Charles Bonnet syndrome, which is characterized by the occurrence of visual hallucinations in individuals with visual impairment. However, this analogy is debatable, if only because visual hallucinations occurring in the context of Charles Bonnet syndrome tend to come and go, whereas closed-eye hallucinations are often described as arising immediately upon eye closure, and lasting continuously until the eyes are opened. And yet in both cases the hallucinations at hand would seem to constitute \*release phenomena. The notion of closed-eye hallucination should not be confused with the notions of \*dream and \*nightmare, or with the notion of \*crepuscular hallucosis, which is reserved for hallucinatory states typically arising in half-light. Neither should it be confused with the \*monocular hallucination, which can be stopped rather than provoked by the closing of an eye.

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## Closed-Eye Visual Hallucination

see Closed-eye hallucination.

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## Closed-Eye Visualization

see Closed-eye hallucination.

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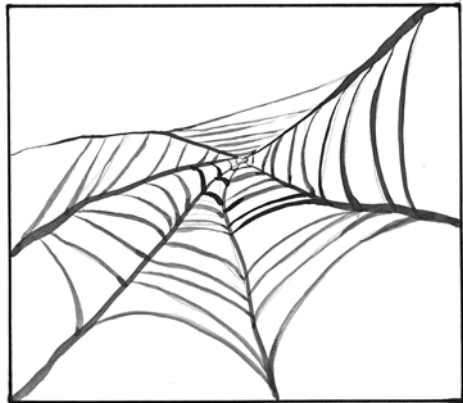
## CNS Stimulants and Hallucinations

see Stimulant psychosis and hallucinations.

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## Cobweb Figure

A term used to denote a type of \*geometric visual hallucination or illusion associated primarily with the use of hallucinogens such as LSD and mescaline. The term cobweb figure was introduced in of shortly before 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to denote one of the four \*form-constants of geometric visual hallucinations occurring during the initial stages of mescaline intoxication. Klüver uses the term form-constant to denote certain visual forms and elements that according to him “appear in almost all mesal visions”. As he maintains, “many ‘atypical’ visions are upon close inspection nothing but variations of these form-constants.” The examples of the cobweb figure given by Klüver, based on the observations of different test persons, are rendered by him as follows. “Colored threads running together in a revolving center, the whole similar to a cobweb”; immense areas over which gigantic cobwebs were



**Fig. 4** Cobweb figure. Illustration by JDB

spread...; cobweb-like forms...” Klüver calls the remaining three form-constants \*chessboard design, \*tunnel, and \*spiral.

### Reference

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## Cocaine Bugs

Also known as \*Magan’s sign and Magnan–Saury’s sign. All three terms refer to a \*tactile hallucination consisting of a crawling foreign body beneath or upon the skin that is associated with the chronic use of cocaine. Except for their exclusive association with the use of cocaine, the notions of cocaine bugs, Magnan’s sign and Magnan–Saury’s sign are phenomenologically compatible with the notions of \*formication, \*formicative hallucination, and \*insect hallucination. Cocaine bugs tend to be accompanied by pruritus and scratching, which may entail even more pruritis, and hence an aggravation of the tactile hallucinations. They may also be accompanied by delusional parasitosis, a condition historically referred to as Ekbo

om’s syndrome, after the Swedish neurologist Karl Axel Ekbo

om (1907–1977), who published various accounts on dermatozoic delusions around 1938. Although the term cocaine bug refers to a type of hallucination confining itself to the tactile modality, the hallucinated bugs involved may also be seen (typically on the skin, within wounds, in the air, on clothing, and on objects in the direct environment). Such accompanying \*visual hallucinations may occasionally develop further into hallucinations depicting individuals (i.e. \*personifications), animals (i.e. \*zoopsia), or objects. An early description of cocaine bugs comes from the Austrian physician Ernst von Fleischl–Marxow (1846–1891), a friend of Sigmund Freud’s (1856–1939). Von Fleischl–Marxow experienced the characteristic tactile and visual hallucinations himself, after the prolonged use of morphine, cocaine, and other substances in the context of analgesia from painful neuro

mata. Ironically, it was Freud who advised him to try cocaine. Formicative hallucinations similar to cocaine bugs, but occurring in the context of amphetamine use, are known as \*crank bugs. Incidentally, the slogan “Cocaine each day keeps

the bugs away” (sometimes cited with reference to the work of the American neurobiologists James A. Nathanson et al.) does not refer to a method to prevent cocaine bugs, but to the experimental use of cocaine in low concentrations as a natural insecticide in agriculture.

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## Cocaine Hallucinosi

The term cocaine hallucinosi refers to the various hallucinatory phenomena associated with the chronic use of cocaine (as in a ‘cocaine run’ or ‘cocaine binge’, which are both characterized by the prolonged consumption of high doses of cocaine). The Italian physiologist and medical anthropologist Paolo Mantegazza (1831–1910) has been credited with publishing the earliest known account of cocaine hallucinosi in 1859. The typical \*paraesthesias or \*formicative hallucinations reported by long-term users of cocaine are referred to as \*cocaine bugs, \*Magan’s sign, and Magnan–Saury’s sign. \*Visual, \*auditory, \*olfactory, \*gustatory, and \*somatic hallucinations have also been reported in the context of chronic cocaine use, although these tend to arise at the later stages of chronic use. The hallucinations of chronic cocaine use range from simple (i.e. \*snow lights, \*halos around bright lights) to formed (geometrical patterns, often in black and white, and often composed of straight lines and dots) to complex (such as \*lilliputian hallucinations or \*zoopsia). \*Metamorphopsias are reported as well, including \*polyopia, \*dysmegalopsia, and \*dysmorphopsia. It has been suggested that there may be a typical order of appearance of the various types of hallucinations in cocaine abuse, starting with the tactile sensations of cocaine bugs, which may then develop into \*visual hal-

lucinations of bugs or vermin moving about on the skin, within wounds, in the air, on clothing, and in the affected individual's direct environment. Reportedly, these visual hallucinations may develop further into hallucinations depicting individuals, animals, or objects. The mediation of hallucinatory phenomena in chronic cocaine use is associated primarily with central pathophysiological mechanisms. It has been suggested, however, that some of the \*phosphenes and geometric visual hallucinations may be \*entoptic phenomena, arising as a consequence of the increased ocular pressure that may accompany states of cocaine intoxication. As a nosological category, cocaine hallucinosis is classified as a specific type of \*hallucinosis syndrome.

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## Cocaine Spots

see Snow lights.

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## Cocaine-Induced Hallucination

Cocaine and its products are known under many names, including coke, freebase, base, rock, and crack. The term cocaine comes from the Quechua word *coca* (which is the native name for the coca plant) and the Latin noun ending *ine*. It was coined in or shortly before 1860 by the German chemist Albert Niemann (1831–1917), who was also the first to isolate coca from coca leaves. Coca leaves stem from the coca plants *Erythroxylon coca* and *Erythroxylon novogranatense*, which are indigenous to the Amazon and the eastern slopes of the Andes. It is believed that the leaves of both *Erythroxylon* species were chewed by Peruvian Incas as early as 4000 BC. From the 1860s onwards, both coca and cocaine were commercialized in the Western world through the production of cocaine cigarettes, cocaine ointments, cocaine nasal sprays, and alcoholic as well as non-

alcoholic drinks prepared with the use of coca or cocaine. Incidentally, the beverage Coca Cola contained actual cocaine until the year 1906. Up to the present cocaine is used in biomedicine as an anaesthetic and analgesic. It was praised by Sigmund Freud (1856–1939) as a rather harmless stimulant (used by himself in modest quantities), as well as a useful therapeutic in the treatment of alcoholism and opioid addiction. Today the raw product, consisting of coca leaves, is either chewed or dried and processed to obtain the active compound benzoylmethylecgonine, an alkaloid of the tropane group. In the form of cocaine hydrochloride, a dry white powder, the drug is used intranasally with the aid of a thin tube or straw. It can also be used intravenously, smoked through a water pipe (called freebasing), or inhaled with the aid of special equipment (in the form of crack, the drug's most potent form). Cocaine is believed to act chiefly as a CNS stimulant. Using the criterion of psychoactive potential as a guiding principle, it is classified as a \*deliriant or a drug of the stimulant-euphoriant class. Its use typically results in euphoria, an increase of physical energy, tachycardia, an increase in body temperature, and a decline in appetite. It may also lead to a paranoid and agitated state (in extreme cases referred to as cocaine dysphoria), hallucinations in any of the sensory modalities, trembling, vomiting, convulsions, and sudden cardiac arrest. \*Cocaine hallucinosis and other perceptual disturbances are associated primarily with the chronic use of cocaine. Following the acute administration of cocaine, hallucinatory phenomena tend to be relatively rare. Tactile hallucinations of animals crawling beneath or upon the skin are referred to as \*cocaine bugs.

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## CODAM

see Defective corollary discharge model for hallucinations.

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## Codeine and Hallucinations

see Opioid-induced hallucination.

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## Coenesthesiopathy

Also known as coenestopathy. The term coenesthesiopathy comes from the medical Latin noun coenesthesia – which in turn comes from the Greek words *koinos* (communal) and *aisthanesthai* (to notice, to perceive) – and the Greek noun *pathos* (suffering). The term coenesthesia was used during the era of classic psychiatry to denote the ‘common sensation’ or ‘common general sensibility’ arising from the sum of all bodily sense impressions. (For a further explanation of the term coenesthesia, see the entry Coenesthetic hallucination.) The French term *cœnesthésiopathie* (i.e. coenesthesiopathy) was introduced in or shortly before 1905 by the French neurologists Paul Camus and Gaston Deny as a generic term for a group of conditions characterized by an alteration of internal bodily feelings (i.e. somatic or coenesthetic feelings). As Camus and Deny write, “We recently proposed to group together, under the very general term *cœnesthésiopathie*, suggested by M.E. Dupré, all psychosyndromes that seem to be connected with an alteration *a*, *hypo*, *hyper*, or *para* of the internal or organic sensations.” Thus Camus and Deny conceive hypocoenesthesiopathy as a diminished awareness of one’s coenesthetic feelings, \*acoenesthesiopathy as a total lack of awareness of one’s coenesthetic feelings, \*hypercoenesthesiopathy as a hypertrophic awareness of one’s coenesthetic feelings, and \*paracoenesthesiopathy as a gross alteration in the quality of one’s coenesthetic feelings. Today the various forms of coenesthesiopathy would probably be classified as \*somatic hallucinations or illusions, as disorders of embodiment, or as disorders of corporeal awareness.

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bles de la cœnesthésie. *Archives de Neurologie*, 20, 257–268.

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## Coenesthetic Autoscopy

Also written as cenesthetic autoscopia. Both terms are indebted to the medical Latin noun coenesthesia, which in turn comes from the Greek words *koinos* (communal) and *aisthanesthai* (to notice, to perceive). The term coenesthesia was used during the era of classic psychiatry to denote the ‘common sensation’ or ‘common general sensibility’ arising from the sum of all bodily sense impressions. (For a further explanation of the term coenesthesia, see the entry Coenesthetic hallucination.) The term *autoscopie cœnesthétique* or coenesthetic autoscopia was introduced in 1903 by the French physician and psychologist Paul Auguste Sollier (1861–1933) to denote a phenomenon characterized by the \*sensed presence of one’s \*double rather than its hallucinated presence. Thus individuals suffering from coenesthetic autoscopia have the intuitive feeling that a *doppelgänger* is present in their immediate surroundings. Sollier classified coenesthetic autoscopia as a variant of \*positive autoscopia. The notion of coenesthetic autoscopia should not be confused with the notions of \*coenesthetic hallucination, \*coenesthesiopathy, and \*acenesthesia.

### Reference

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## Coenesthetic Hallucination

Also written as cenesthetic hallucination. Both terms translate loosely to ‘hallucination of auto-somatic awareness’. They are used to denote a \*somatic hallucination consisting of a peculiar visceral or other bodily sensation that cannot be explained by reference to any known physiological mechanism. Some examples of coenesthetic hallucinations are a scratching feeling against the inside of one’s skull, and the feeling of a propeller turning around inside one’s stomach. The term coenesthetic hallucination is also used in a broader sense to denote a hallucination involving the ‘common sensation’ or ‘common gen-

eral sensibility'. To clarify this connotation of the term coenesthetic hallucination, it is necessary to explain the notion of coenesthesia. The term coenesthesia is indebted to the Greek words *koinos* (communal) and *aisthanesthai* (to notice, to perceive). The introduction of the expression *koinē aisthesis* has been attributed to the Greek philosopher Aristotle (384–322 BC). The term was reintroduced during the late 18th century in the form of coenesthesia, or coenesthesia (in German *Gemeingefühl*) to denote the “common sensation” or “common general sensibility” arising from the sum of all bodily sense impressions. In everyday parlance, coenesthesia is the general feeling addressed by questions such as “How are you?” and “How do you feel?”. Any attempt to answer these questions with more than the usual cordial counter question requires a brief inspection of one’s status quo, involving issues such as “Am I hungry,” “Do I feel any pain,” “Do I feel rejected,” “Is that really a headache kicking in,” “Am I in love,” “Are my shoelaces too tight,” and so on. In accordance with the 19th-century viewpoint, issues such as these combine to form one’s coenesthetic feeling. As the Italian psychiatrist Eugenio Tanzi (1856–1934) explains, “The united and incessant exercise of the sensory functions is the perennial source, not only of all special information that is supplied to us regarding the external world and our body, but also of a general and indistinct, but often very active, consciousness that enables us from moment to moment to recognize the functional intactness of the body in all its parts, including those which, owing to being isolated and in a normal condition, never make themselves felt.” Feelings historically relegated to the class of coenesthesia include pain, ticklish feelings, hunger, thirst, sexual lust, fatigue, and boredom. They are considered closely akin to affective states, and even to personality traits. Many of the classic textbooks of psychiatry refer to coenesthetic hallucinations, or disturbances of coenesthesia, as explanations for bizarre types of behaviour occurring in the context of serious mental disorder, including fasting, binge eating, pica, chronic inactivity, manic hyperactivity, excessive masturbation, and so on. Conceptually, the notion of coenesthetic hallucination is closely related to the notion of \*distortion of vital sensation. Whether the two phenomena fulfil all the formal criteria of hallucinations proper is debatable. A rather different way in which the term coenesthetic hallucination is used stems from the 1982 *Manual for the*

*Assessment and Documentation of Psychopathology*, which employs the term as a synonym for the general expression \*bodily hallucination (which in turn is used as an umbrella term for the notions of \*tactile hallucination and somatic hallucination). The notion of coenesthetic hallucination should not be confused with the notions of \*coenesthetic autoscapy, \*coenesthesiopathy, and \*acenesesthesia.

### References

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- Tanzi, E. (1909). *A text-book of mental diseases*. Translated by Ford Robertson, W., Mackenzie, T.C. London: Rebman Limited.

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## Coenestopathy

see Coenesthesiopathy.

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## Cognitive Behavioural Therapy

see Cognitive therapy and hallucinations.

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## Cognitive Illusion

Also known as strategy illusion and perceptual illusion. The term cognitive illusion is indebted to the Latin noun *cognoscere*, which means to learn or to scrutinize. It refers to an \*illusion arising as a consequence of unconscious inferences about the nature of the physical world, rather than from physical or neurophysiological mechanisms. Some examples of cognitive illusions are \*geometric-optical illusions such as the impossible figures in the artwork of the Dutch graphic artist Maurits Cornelis Escher (1898–1972), and the \*Necker cube. The neuropsychological substrate of cognitive illusions is in the realm of higher-order cognitive processes such as \*apophenia (i.e. an excess of perceptual

or heuristic sensitivity leading to the discernment of patterns or connections in random or meaningless data). The term cognitive illusion is used in opposition to the terms \*physical illusion and \*physiological illusion.

### References

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- Ninio, J. (2001). *The science of illusions*. Translated by Philip, F. Ithaca, NY: Cornell University Press.

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## Cognitive Model of Hallucinations

A generic term referring to a group of explanatory models that emphasize the role of cognitive rather than biological mechanisms in the mediation of hallucinations. As these cognitive mechanisms are generally understood in the wider context of a neuropsychological framework that incorporates relevant biological factors, the term cognitive model should not be interpreted here as referring to an explanatory model focusing exclusively on mental processes. Traditionally, cognitive models of hallucinations have focused predominantly on the group of \*auditory hallucinations. The major psychological mechanisms addressed by these models are an unusual vividness of auditory images in hallucination-prone individuals, the quality of their \*inner speech, and default source monitoring of inner speech. However, many cognitive models are multifactorial in nature, incorporating a wide range of mechanisms and coping strategies in their explanatory theses. The American psychoanalyst and founder of cognitive therapy Aaron T. Beck (b. 1921) and the Canadian psychologist Neil A. Rector summarize their cognitive model of auditory hallucinations (designed with reference to individuals with a clinical diagnosis of \*schizophrenia) as follows. “The formation, fixation, and maintenance of hallucinations are dependent on multiple determinants: Hypervalent (‘hot’) cognitions of sufficient energy to exceed perceptual threshold and consequently to be transformed into hallucinations, a low threshold for auditory perceptualization exacerbated by stress, isolation, or fatigue, an externalizing bias that reinforces the purported external origin of the voices and resource-sparing strategies that help to fix belief in external origin and diminished reality-testing. . . The

maintenance of hallucinations is, in turn, determined by a range of beliefs: delusions regarding an external agent, underlying core beliefs, and the perceived ‘relationship’ with the voices. Specific coping responses and safety-seeking behaviours are also implicated.” In addition to these cognitive mechanisms, Beck and Rector acknowledge the contribution of biological factors such as neuronal hypoconnectivity, an excessive priming of neurons during adolescence, and “cerebral flooding” with dopamine. Crucial to cognitive models such as those of Beck and Rector is the assumption that cognitions can be transformed into percepts, whereas biomedical models of hallucinatory experience tend to grant cognitions no more than a pathoplastic or shaping role with reference to the content of hallucinations.

### References

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## Cognitive Therapy and Hallucinations

Cognitive therapy (CT) is also known as cognitive behavioural therapy. Both terms are indebted to the Latin noun *cognoscere*, which means to learn or to scrutinize. They refer to a psychotherapeutic intervention that aims to reduce the individual’s degree of suffering by influencing the interpretation of his or her negative feelings and problematic behaviour. The development of this method is traditionally attributed to the American psychoanalyst and neuropsychiatrist Aaron T. Beck (b. 1921). In 1952 Beck published the first case report of CT in an individual with a chronic psychotic disorder. In individuals with \*auditory hallucinations, the primary aim of CT is to re-label the meaning of the voices’ content, thus reducing the degree of power and malevolence attributed to them. More specifically, CT seeks to counter the notion that voices are externally generated, that they represent the individual’s own feelings or wishes, that they have power over the hallucinator, and that there are meaningful intentions behind them. Today CT is recognized

as an evidence-based intervention for delusions and \*auditory hallucinations in countries such as Great Britain, Scotland, Australia, New Zealand, and the Netherlands. Although reports of a substantial reduction in the frequency and/or intensity of hallucinations due to CT are rare, the simple re-labelling of the meaning and significance of these phenomena alone has been shown to have the potential to reduce overall anxiety and distress, and increase the affected individual's feelings of empowerment and control.

### References

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- Van der Gaag, M. (1992). *The results of cognitive training in schizophrenic patients*. Thesis University of Groningen.

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## Coherent Tinnitus

A term used to denote a subtype of \*tinnitus (i.e. 'ringing in the ears') presenting as a single, centred, auditory percept. Regarding its pathophysiology, coherent tinnitus is associated primarily with a single central lesion, or, alternatively, with bilateral peripheral lesions producing similar \*nonverbal auditory hallucinations. The term coherent tinnitus is used in opposition to the term \*incoherent tinnitus.

### Reference

- Henry, J.A., Dennis, K.C., Schechter, M.A. (2005). General review of tinnitus: Prevalence, mechanisms, effects, and management. *Journal of Speech, Language, and Hearing Research*, 48, 1204–1235.

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## Coincidental Hallucination

The term coincidental hallucination is indebted to the Latin noun *coincidentia*, which means simultaneous occurrence. It used to denote a type of hallucination that is believed to coincide in a meaningful way with an actual event taking place in the external world. In reports of hallucinations designated as coincidental the images tend to be visual or compound in nature, although auditory and tactile phenomena are reported as well. These images can depict any given situation or event, but in the literature they often pertain to an individual who is ill or dying at the moment the hallucination takes place. When a temporal as well as an intrinsic relation can be demonstrated between the actual individual and the hallucination at hand, the term \*veridical hallucination is used. Both coincidental and veridical hallucinations are sometimes conceptualized as \*telepathic hallucinations, although other putative mechanisms have also been suggested by parapsychologists. Claims of having experienced a coincidental hallucination have been made from the earliest times to the present day. The multitude of claimed contacts with the dead circulating during the latter half of the 19th century culminated in the publication of the book *Phantasms of the Living* by the British paranormal investigators Edmund Gurney (1847–1888), Frederic Myers (1843–1901), and Frank Podmore (1856–1910). This book contains 5,700 first-hand descriptions of \*apparitions. It proved a major source of inspiration for the \*Census of Hallucinations, carried out between 1889 and 1892 by the Society for Psychical Research (SPR) among 17,000 individuals in the non-institutionalized population of the United Kingdom. Within this population the SPR found a sky-rocketing odds ratio of 440 for the occurrence of coincidental hallucinations. As a corollary, the SPR concluded that "between deaths and apparitions of the dying person a connexion exists which is not due to chance alone." However, critics such as the German hallucinations researcher Edmund Parish (1861–1916) suggest that a substantial number of the reported \*visions are really \*memory hallucinations (i.e. false memories conjured up afterwards to fit a meaningful mould) or other types of \*non-coincidental hallucinations. In the final analysis, it would seem that the issue of whether or not to believe in the possibility of coinciden-

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## Cohn, Helen

see Schucman, Helen.



tal and veridical hallucinations is not decided by empirical studies, even when they are carried out as thoroughly as the SPR's.

### References

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### Cold Allodynia

see Allodynia.

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### Collective Apparition

see Collective hallucination.

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### Collective Hallucination

Also known as collective percipience and collective apparition. All three terms are indebted to the Latin adjective *collectivus*, which means gathered or united. They are used to denote a rare type of hallucination that is shared by a limited number of individuals (typically two or three), and which those individuals believe to be \*veridical or at least \*coincidental in nature. The German hallucinations researcher Edmund Parish (1861–1916) distinguishes collective hallucinations from \*epidemic hallucinations, using the latter term exclusively for cases where great crowds of people are overcome by the – hysterical – notion of sharing a common hallucinatory percept. Explanations for the working mechanism of collective hallucinations range from sheer chance to an ‘infectious’ type of telepathy to the so-called ‘psychical invasion’ of certain places by spiritual powers. Perhaps the most plausible explanation, at least from the vantage point of the biomedical paradigm, stems from the British mathemati-

cian and parapsychologist George Nugent Merle Tyrrell (1897–1952). As suggested by Tyrrell, collective hallucinations may well be promoted by the physical presence of percipients in a shared environment, which in turn suggests to them a shared idea-pattern or percept. However, Tyrrell's solution would seem to stand and fall with the assumption that each of the percipients must be considered prone to hallucinatory activity (or, in a parapsychological reading, must be considered ‘connected telepathically’ to an agent actually present). In the context of the late 19th-century \*Census of Hallucinations, in which 27,329 individuals were polled in Great Britain, Germany, France, and the United States, collective hallucinations formed 8% of the total. Parish collected and critically examined a number of historical reports of collective hallucinations, concluding that they were most likely indebted to suggestion and/or a shared preoccupation of the individuals involved (for example, with a feared or beloved person, or with the impending arrival of enemy troops). In addition, he points out the possible influence of peculiar environmental and/or atmospheric circumstances, such as dusk, foggy weather, or the moment immediately following a thunderstorm, which might be of aid in creating suitable \*points de repère for hallucinations or \*illusions. Finally, Parish presents various reports of collective hallucinations that he attributes to \*physical illusions such as \*mirages. One such case was described by him as follows. “So early as 1785 the appearance of spectral soldiers on several days in January and February, at Ujest (Silesia), was explained by mirage, which rendered visible a detachment of troops marching to the funeral of a certain General von Cosel.”

### References

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Tyrrell, G.N.M. (1953). *Apparitions. Revised edition*. London: The Society for Psychological Research.

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## Collective Perception

see Collective hallucination.

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## Coloropsia

The term coloropsia comes from the Latin noun *color* (colour) and the Greek verb *opsis* (seeing). It is used to denote a type of \*chromatopsia (i.e. a temporary aberration of colour vision) mediated by a cerebral cortical lesion or process.

### Reference

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## Colour Audition

see Colour hearing.

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## Colour Blindness

The term colour blindness was introduced in or shortly before 1844 by the Scottish physicist and *homo universalis* David Brewster (1781–1868) as an alternative for the expression \*Daltonism. Brewster's proposal for this new name was inspired by his observation that there are actually more colour defects than those described by John Dalton (1766–1844) in his 1794 article on the subject. The term colour blindness refers to the inability or diminished ability to distinguish between two or more colours. Although this group of visual deficiencies is traditionally referred to as colour blindness, true colour blindness (i.e. \*achromatopsia) is extremely rare. What is generally meant by the term colour blindness is a \*colour vision deficiency. As a consequence, the term colour vision deficiency is the preferred term to denote any of these conditions.

## References

- Brewster, D. (1826). On the invisibility of certain colours to certain eyes. *Edinburgh Journal of Science*, 4, 85–87.
- McIntyre, D. (2002). *Colour blindness. Causes and effects*. Chester: Dalton Publishing.

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## Colour Hearing

Also known as coloured hearing, coloured hearing synaesthesia, sound-colour synaesthesia, opsiphonia, colour audition, and *audition colorée*. All these terms are used interchangeably to denote the most common variant of \*synaesthesia, consisting of a \*chromatism (i.e. a hallucinated colour, or coloured light) arising simultaneously with, or in succession to, a regularly perceived sound. The Hungarian-Dutch experimental psychologist Géza Révész (1878–1955) defines colour hearing as follows. “By *colour hearing* we understand the *fixed permanent association of acoustic sensations with optical images*. In persons with pronounced colour hearing, certain tonal stimuli always create *involuntarily, regularly, and constantly* the same colour sensation (so-called chromatisms or photisms). These chromatisms or photisms can be divided into three classes, according to type: *perceptual*, as though the colours were actually seen; *conceptual*, when the colour is envisaged as an ideated sensation; and *mental*, when the colour comes to mind, when only its name is suggested to the conscious mind.” In 1786, the physicist and mathematician Johann Leonhard Hoffman published a matching list of musical instruments and colours. Whether this list was based on actual colour hearing is unknown, but it has been referred to as the earliest known historical example of this type of synaesthesia. The oldest known written report on synaesthesia, by the Austrian philologist F.A. Nussbaumer, published in 1873, involved a case of colour hearing, or, more specifically \*coloured music. It has been known since the late 19<sup>th</sup> century that the relation between colours and sounds tends to be systematic in individual cases of synaesthesia, but no interindividual – let alone universal – relation was ever established. In general, deeper tones tend to be associated with darker colours, and higher tones with brighter ones, but this relation itself tends to vary from person to person. Moreover, some people seem to respond to timbre, others to vowels or

specific musical tones. The *Revue de l'Hypnotisme* of December 1892 includes a case report on the transformation of *audition colorée* into *gustation colorée* (i.e. \*coloured taste) in a person whose somatic condition was deteriorating at the time.

### References

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- Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception.* London: Walter Scott.
- Révész, G. (2001). *Introduction to the psychology of music.* Translated by de Courcy, G.I.C. Mineola, NY: Dover Publications.

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## Colour Scotoma

A term used to denote a variant of \*achromatopsia, characterized by the inability or diminished ability to perceive a specific colour within an island-shaped part of the visual field.

### Reference

- Zeki, S. (1990). A century of cerebral achromatopsia. *Brain*, 113, 1721–1777.

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## Colour Vision Deficiency

Also known as \*colour blindness and anomalous colour vision. All three terms refer to the inability or diminished ability to distinguish between at least two colours. Although this group of visual deficiencies is traditionally known as colour blindness, true colour blindness (i.e. \*achromatopsia) is extremely rare. What is generally signified by the term colour blindness is one of a group of colour vision deficiencies. As a consequence, the term colour vision deficiency is the preferred term to denote any of these conditions. Because the human optical system is trichromatic (as opposed to some animal systems which are quadrichromatic), persons with normal colour vision are called normal trichromats. Colour vision deficiencies in humans present in the form of \*monochromatism, \*dichromatism, or \*anomalous trichromatism. Usually both eyes are affected, but rare cases of unilateral colour

vision deficiency have also been described. Individuals with monochromatism are unable to discriminate differences in hue. In dichromatism, the affected individual is able to detect differences in hue, except for those between two primary colours. There are three basic varieties of dichromatism, called \*protanopia, or red-green colour vision deficiency; \*deutanopia, or green-red colour vision deficiency; and \*tritanopia, or blue-yellow colour vision deficiency. Etiologically, all three conditions are associated primarily with specific chromosomal deficits. Pathophysiologically, colour vision deficiencies are attributed to the absence or diminished function of the long-, medium-, or short-wavelength cones within the retina. As a consequence, colour vision deficiencies have traditionally been labelled as \*entoptic phenomena. They have an estimated lifetime prevalence of 8% in men and 0.5% in women. Colour vision deficiencies may be either congenital (i.e. hereditary), or acquired through trauma or disease. Etiological factors in acquired colour vision deficiencies include multiple sclerosis, optic neuritis, anaemia, leukaemia, vitamin B1 deficiency, carbon disulphide intoxication, lead poisoning, thallium poisoning, nicotine poisoning, and chronic alcohol abuse. The correlations between the transmission of colour vision deficiencies, genes, and sex linkage were first established by the American zoologist and geneticist Edmund Beecher Wilson (1856–1939). Colour vision deficiencies should not be confused with \*chromatopsia and the group of \*colour-processing deficits.

### References

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- McIntyre, D. (2002). *Colour blindness. Causes and effects.* Chester: Dalton Publishing.

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## Coloured Hearing

see Colour hearing.

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## Coloured Hearing Synaesthesia

see Colour hearing.

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## Coloured Language

Also known as coloured words. Both terms are used to denote a \*chromatism (i.e. a hallucinated colour or coloured light) arising simultaneously with or in succession to linguistic elements. Coloured language is classified as one of the many forms of \*synaesthesia. Although colour-word correspondences are idiosyncratic, intrindividually they tend to be quite consequential. Phenomenologically, coloured language can be either word-based (connected with the Gestalt of words), graphemic (connected with the way it is written), phonemic (connected with the way it sounds), or numeric (pertaining to numbers). Following this arrangement, coloured language can be divided into chromatic-lexical synaesthesias, chromatic-graphemic synaesthesias, chromatic-phonemic synaesthesias (i.e. \*phonopsia), and chromatic-numeric synaesthesias.

### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition.* Cambridge, MA: MIT Press.

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## Coloured Music

Also referred to as music-colour synaesthesia. Both terms are used to denote a \*chromatism (i.e. a hallucinated colour or coloured light) arising simultaneously with or in succession to a musical element such as a key, a bar, or a composition. Coloured music is classified as one of the many forms of \*synaesthesia. The German psychiatrist Johannes Stein (1871–1951) describes a test subject in a mescaline experiment who saw colours corresponding to the tones of a flute: carmine red when an A was played, greenish yellow for E flat, a yellowish tint for F, violet for D, and blue and red for E. Although colour-key correspondences such as these tend to be consistent for a given individual over many years, interindividual correspondences have never been found. The first known description of coloured

music comes from the Austrian philologist F.A. Nussbaumer, who in 1873 published an account of his brother's and his own experiences with this phenomenon since childhood. Two other historical figures who claimed to be familiar with coloured music are the Russian composers Nikolai Rimsky-Korsakov (1844–1906), and Alexander Scriabin (1872–1915).

### References

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## Coloured Taste

Also known as *gustation colorée*. Both terms are used to denote a \*chromatism (i.e. a hallucinated colour, or coloured light) arising simultaneously with, or in succession to, a taste sensation. Coloured taste is classified as one of the many forms of \*synaesthesia.

### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition.* Cambridge, MA: MIT Press.

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## Coloured Words

see Coloured language.

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## Colour-Processing Deficit

A generic term for a group of visual phenomena characterized by a marked loss or alteration of colours attributed to a lesion affecting the sensory cortex and/or white matter. Due to a colour-processing deficit, colours may either seem dif-

ferent in some way (i.e. darker or brighter), or they may be substituted by shades of grey. The group of colour-processing deficits comprises the classes \*achromatopsia and \*dyschromatopsia. Colour-processing deficits are traditionally distinguished from other types of anomalous colour vision, such as \*colour vision deficiency and \*chromatopsia.

#### Reference

Zeki, S. (1990). A century of cerebral achromatopsia. *Brain*, 113, 1721–1777.

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### Command Hallucination

see Imperative hallucination.

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### Complementary Afterimage

The term complementary afterimage refers to a type of \*afterimage in which the hues are approximately the complements of those in the original stimulating field. The complementary afterimage of a yellow circle, for example, is executed in blue. The term complementary afterimage is used in opposition to the term \*homochromatic afterimage (which refers to an afterimage in which the distribution of hues is the same as that of the original stimulation field). Complementary afterimages are commonly classified as \*physiological illusions.

#### Reference

Brown, J.L. (1965). *Afterimages*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: John Wiley & Sons.

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### Complete Hallucination

A term used to denote a hallucination fulfilling all the formal characteristics of \*hallucinations proper, in the sense that it perfectly mimics a regular sense perception. The French psychiatrist Pierre Lelong conceptualizes complete hallucinations as dissociated or depersonalized mental elements that are somehow transformed into ego-alien or ego-dystonic percepts. According to Lelong, this transformation involves three sub-

sequent stages, namely obsession (characterized by self-consciousness and anxiety), \*psychic hallucination (characterized by depersonalization and \*automatisms), and \*sensorial hallucination (characterized by its subconscious nature, and its seeming objectivity). Complete hallucinations are traditionally considered prognostically unfavourable. Whereas the 'desensorialisation' of hallucinations tends to be interpreted as a sign of recovery, the 'concretisation' or 'reconcretisation' of hallucinations tends to be interpreted as a sign of deterioration or relapse. The term complete hallucination is used in opposition to the terms \*incomplete hallucination and \*rudimentary hallucination.

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 Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

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### Complex Hallucination

A term used to denote a phenomenologically rich and often well-organized type of hallucination that is confined to a single sensory modality. Theoretically, complex hallucinations may present in any of the sensory modalities. It is customary, however, to reserve the term for hallucinations experienced in the \*visual or \*auditory modalities. In the auditory modality, complex hallucinations typically take the form of well-articulated speech, elaborate and realistic environmental sounds, or music. In the visual modality, they typically take the shape of a person, a face, an animal, a landscape, a scene, or a composite image of fantasy elements. When a complex hallucination replaces the entire sensory input picture, it is referred to as a \*scenic or \*panoramic hallucination. Pathophysiologically, complex hallucinations are traditionally associated with aberrant neurophysiological activity in higher-level cortical regions, such as those in the temporal lobe. It has been suggested, however, that the initial impulse for the mediation of complex hallucinations may stem from other cerebral structures, such as the limbic system (rendering a \*reperceptive hallucination), the pedunculus cerebri (rendering a \*peduncular hallucination), or the speech areas (rendering a \*verbal auditory

hallucination). Moreover, complex hallucinations have been described in individuals suffering from lesions affecting the primary sensory cortex, and from lesions affecting the peripheral sense organs. It is unlikely that lesions in such early sensory structures can be held responsible for mediating complex hallucinations. Instead, it has been suggested that such lesions act via the \*deafferentation of higher-level cortical areas, which are in turn responsible for mediating the hallucinations at hand. The term complex hallucination derives from a classification of hallucinations governed by the guiding principle of complexity. It is used in opposition to the terms \*simple (or \*elementary) hallucination and \*geometric hallucination. When hallucinations are experienced in more than one sensory modality at a time, they are referred to as \*compound hallucinations.

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### Complex Regional Pain Syndrome (CRPS)

see Causalgia.

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### Complicated Metamorphopsia

The term complicated metamorphopsia comes from the Latin verb *complicare* (to fold together), and the Greek words *metamorphoun* (to change the form) and *opsis* (seeing). It is used to denote a type of \*metamorphopsia (i.e. a visual distortion) that is accompanied by an alteration in the affective tone of one's experience of the extracorporeal environment, analogous to cases of \*kalopsia

or \*kakopsia (i.e. seeing things as beautiful or ugly, respectively). The term complicated metamorphopsia is used in opposition to the term \*simple metamorphopsia.

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### Compound Hallucination

Also known as multimodal hallucination, polymodal hallucination, polysensual hallucination, polysensory hallucination, polysensorial hallucination, intersensorial hallucination, and fantastic hallucination. All these terms are used to denote a hallucination experienced in more than one sensory modality at a time. Some examples of compound hallucinations are the audiovisual hallucination, the \*audioalgesic hallucination, and the \*audiovisuoalgesic hallucination. When a compound hallucination replaces the total \*sensory input, it is referred to as a \*scenic or \*panoramic hallucination. When it depicts one or more human beings, it is referred to as a \*personification. In a study by the American psychiatrists Donald W. Goodwin (1932c–1999) et al. among 117 individuals with varying clinical diagnoses (i.e. affective disorder, acute and chronic \*schizophrenia, alcoholism, organic brain syndrome or hysteria) compound hallucinations were found to be relatively rare, whereas the subsequent occurrence of hallucinations in two or more different sensory modalities was reported by three-quarters of the population under study. The simultaneous occurrence of these hallucinations was reported by 50% of the individuals with a clinical diagnosis of affective disorder or schizophrenia, but only as an infrequent experience. The term compound hallucination derives from a classification of hallucinations governed by the number of sensory modalities involved. It is used in opposition to the term \*unimodal hallucination.

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**Compulsive Hallucination**

A term used to denote a hallucination in which a perceptual memory trace or fantasy is compulsively retrieved and re-experienced, often in a repetitive manner. Two examples of compulsive hallucinations are drug-related \*flashbacks, and flashbacks occurring in the context of \*post-traumatic stress disorder. The notion of compulsive hallucination should not be confused with the notions of \*hallucinatory obsession and \*obsessional hallucination, which have a related, but slightly different connotation. All three types of hallucination have been described in individuals with a clinical diagnosis of obsessive-compulsive disorder and/or \*schizophrenia, but they may also occur in other conditions, as well as in individuals without a psychiatric diagnosis.

**Reference**

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**Conception Hallucination**

see Psychic hallucination.

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**Conceptual Synaesthesia**

The term conceptual synaesthesia comes from the Latin adjective *conceptualis* (pertaining to the mental concept), and the Greek words *sun* (together, unified), and *aisthanesthai* (to notice, to perceive). The concept was introduced in or shortly before 1954 by the Hungarian-Dutch experimental psychologist Géza Révész (1878–1955) to denote a \*synaesthesia in which

the secondary sensation is an ideated sensation rather than a hallucinated percept. For example, in \*colour hearing of the conceptual synaesthesia type the actual sound of a trumpet may trigger an imagined colour rather than a hallucinated colour. The term conceptual synaesthesia is used in opposition to the terms \*mental synaesthesia and \*perceptual synaesthesia.

**Reference**

- Révész, G. (2001). *Introduction to the psychology of music*. Translated by de Courcy, G.I.C. Mineola, NY: Dover Publications.

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**Conductive Tinnitus**

A term used to denote a type of \*tinnitus (i.e. ‘ringing in the ears’) attributed to otosclerosis. The term conductive tinnitus is used in opposition to the terms \*sensorineural tinnitus and \*central tinnitus.

**Reference**

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**Cone**

see Tunnel.

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**Cone-Monochromatism**

see Achromatopsia.

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**Confuso-oneiric State**

see Delirium.

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**Contingent Aftereffect**

Also known as contingent perceptual aftereffect. Both terms are used to denote a type of

\*aftereffect that is dependent on (i.e. contingent with) the orientation of the perceived object with respect to the retina. An example is the \*McCullough effect, in which the prolonged and alternate viewing of two differently coloured grid patterns with opposite orientations, and the subsequent viewing of a similar pattern in black and white, yields an illusory perception of complementary colours. The contingent aftereffect is classified as a \*physiological illusion.

### Reference

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## Contingent Perceptual Aftereffect

see Contingent aftereffect.

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## Continuity Hypothesis

In hallucinations research, the term continuity hypothesis is used as a generic term for a group of hypothetical models that conceptualize hallucinations as lying on a continuum with other percepts such as sense perceptions, \*illusions, \*dreams, \*imagery, and fantasies. In some versions of the continuity hypothesis even cognitive phenomena such as thoughts and memories are taken into the equation. In different models, the alleged continuity between these phenomena is either understood in a phenomenological or a neurophysiological sense. As summarized by the American philosopher C. Wade Savage, "Any of the following formulations are candidates: (1) The experiences listed are composed of the same stuff, so to speak; they differ not in kind, but in degree – degree of vivacity, coherence, voluntariness, creativeness, concreteness, and veridicality. For example, perceptions are often more vivid than dreams; fantasies are usually more voluntary than perceptions. (2) The experiences listed are not sharply distinguishable from one another, as the existence of intermediate cases shows. For example, between a vivid hallucination and a not-so-vivid dream, we can find an experience intermediate in vivacity, and we may be unsure whether to call it a dream or an hallucination. (3) The experiences listed can evolve into, become

transformed into, one another. For example, a dream, on waking, may evolve into a fantasy; a perception, on falling asleep, may evolve into a dream. (4) The internal mechanisms of the experiences listed, the processes by means of which they are produced, are similar." Two historical examples of continuity hypotheses are those of the French psychiatrist Jacques-Joseph Moreau de Tours (1804–1884), who stresses the phenomenological similarities between dreams, hallucinations of \*delirium, and hallucinations induced by \*hashish, and of the French classical scholar and dream researcher Louis-Ferdinand-Alfred Maury (1817–1892), who suggests the existence of a common physiological mechanism called \*oneirism underlying both dreams and hallucinations.

### References

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- Moreau, J.-J. (1845). *Du hachisch et de l'aliénation mentale. Études psychologiques*. Paris: Fortin Masson.
- Savage, C.W. (1975) *The continuity hypothesis*. In: *Hallucinations. Behavior, experience, and theory*. Edited by Siegel, R.K., West, L.J. New York, NY: John Wiley & Sons.

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## Convergence Micropsia

Also referred to as accommodative micropsia, accommodation-convergence micropsia, and oculomotor micropsia. All three terms are used to denote a type of \*micropsia (i.e. the visual perception of an object or stimulus that is apparently decreased in size) due to convergence and accommodation of the eyes, as may occur in squinting, for example. The process of reducing the apparent size of objects and stimuli is called \*minification. The British scientist and inventor Charles Wheatstone (1802–1875) has been credited with being the first to report on convergence micropsia *avant la lettre* in 1852. The term accommodative micropsia appears in the 1939 *Text-book of Ophthalmology* by the Scottish ophthalmologist Sir Stewart Duke-Elder (1899–1978). Experimental research suggests that this physiological type of micropsia is due mainly to convergence, and only to a lesser extent to accommodation



of the eyes. Additional mechanisms that may play a part in the mediation of convergence micropsia, albeit to an even lesser extent, are the pinhole effect (i.e. in cases where an object is observed through a pinhole), the shift in the position of the nodal point of the eye while it accommodates, and perhaps a central mechanism connected with the \*corollary discharge signal coinciding with accommodation. Convergence micropsia is classified as a \*physiological illusion.

### References

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## Convergence Phosphene

A term used to denote a \*phosphene (i.e. ‘seeing stars’) arising physiologically in association with convergence of the eyes. In 1978 the American neuroscientist Christopher W. Tyler proposed a distinction between two types of convergence phosphene: one mediated by rapid convergence movements, and one mediated by prolonged convergence movements. Phenomenologically, the type of phosphene which follows rapid convergence movements is characterized by two large rings that can be seen best in a dark environment. This type is also referred to as the \*fiery rings of Purkinje, after the Bohemian physiologist Johannes Evangelista Purkyně (1787–1869), who described the phenomenon in his textbook of 1823. The mediation of the fiery rings of Purkinje is attributed to stretching of the optic nerves and the region of the papillae, followed by peripheral neuronal discharges. The second type of convergence phosphene, occurring after sustained convergence of the eyes, can be best perceived with eyes closed against an illuminated background. This type is characterized by a red dumbbell-shaped form that extends horizontally from the region of the fovea to the periphery. Because of

its shape, this type of phosphene is also referred to as a \*dumbbell phosphene or dumbbell-shaped phosphene. Convergence phosphenes are classified either as \*entoptic phenomena or as \*physiological illusions. The term convergence phosphene is used in opposition to the terms \*flick phosphene, \*movement phosphene, and \*sound phosphene.

### References

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## Conversion

see Sensory conversion.

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## Conversion Anaesthesia

Also known as psychogenic anaesthesia. Both terms are used to denote the inability or strongly diminished ability to perceive tactile sensations, due to \*sensory conversion. An extreme variant of this symptom, described in hypnosis and classical cases of hysteria, is known as \*total or \*systematized anaesthesia.

### Reference

- Braude, S.E. (2004). *Memory: The nature and significance of dissociation*. In: *The philosophy of psychiatry. A companion*. Edited by Radden, J. Oxford: Oxford University Press.

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## Conversion Blindness

see Hysterical blindness.

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## Conversion Hallucination

see Conversive hallucination.

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## Conversive Hallucination

Also known as conversion hallucination. Both terms are used to denote a hallucination attributed to \*sensory conversion. Sensory conversion is conceptualized as an unconscious process by means of which anxiety, generated by an intrapsychical conflict, is transformed into a perceptual symptom. Conversive symptoms are by definition suggestive of a neurological disorder, although upon state-of-the-art clinical examination they remain inexplicable. The term conversive hallucination is traditionally used in opposition to the term \*psychotic hallucination, so as to emphasize its purportedly non-psychotic origin. Although the conceptual distinction between conversive and psychotic hallucinations is not self-evident, it has been claimed that conversive hallucinations are relatively rare, and that they tend to occur in the form of recurring \*complex visual, \*scenic, and/or \*auditory hallucinations depicting prior experiences from the affected individual's life, especially when these are emotionally charged. In older, clinical studies, conversive hallucinations are reported in up to 88% of the individuals with a clinical diagnosis of hysteria. Classical examples of conversive hallucinations include those depicting a previously witnessed traumatic scene, those re-enacting prior physical or sexual abuse, and those depicting a fervently wished-for, but practically impossible situation (such as the wish for a relationship with a married person, or with a person of the same sex). Explanatory models for the mediation of conversive hallucinations tend to revolve around the notion of \*dissociation with restricted awareness, meaning that percepts that would normally be appreciated as endogenous or imaginary in nature, are considered real because of a certain misinterpretation and/or misperception, which is in turn attributed to a restricted awareness. A competing model to these 'dissociative' models is the cognitive model, which attributes the mediation of conversive hallucinations to the so-called extension of thoughts to images, known in the older literature as \*perceptualization of the concept. Conversive hallucinations are generally classified as \*psychogenic hallucinations. Conceptually as well as phenomenologically, they would seem to display a certain similarity to Freud's \*hallucinatory confusion.

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## Cornsweet Edge

see Cornsweet effect.

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## Cornsweet-Edge Effect

see Cornsweet effect.

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## Cornsweet Effect

Also known as Cornsweet edge, Cornsweet-edge effect, Cornsweet stimulus, Cornsweet illusion, Craik–Cornsweet illusion, Craik–O'Brien–Cornsweet illusion, and Craik–O'Brien effect. The eponym Cornsweet effect refers to the American cognitive psychologist Tom Norman Cornsweet (b. 1929), who described the concomitant phenomenon in or shortly before 1970. The eponym Craik–O'Brien effect refers to two authors responsible for an earlier description of the same phenomenon. In 1940 the Scottish philosopher and psychologist Kenneth John William Craik (1914–1945) was the first to describe it in his doctoral thesis. However, Craik died in a car accident before his discovery was published. It was the American physicist Vivian O'Brien (b. 1924) who rediscovered the phenomenon and published it in 1958. All the above eponyms refer to a contrast illusion in which a difference in hue is observed between two adjacent fields of equal hue that are interconnected by a contrast edge with a colour gradient on one side. Only when the colour gradient is covered or removed, the perceptual system is able to recognize the two fields as being of the same hue. The mediation of the Cornsweet effect is commonly attributed to a cortical filling-in process, although it is generally acknowledged that its neurobiological correlates are not fully understood. Because it arises from the inherent properties of the perceptual system, the Cornsweet effect can be

classified as a \*physiological illusion. It should not be confused with a related contrast illusion called \*Mach bands.

### References

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- Craik, K.J.W. (1940). *Visual adaptation*. Unpublished doctoral thesis, Cambridge University.
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### Cornsweet Illusion

see Cornsweet effect.

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### Cornsweet Stimulus

see Cornsweet effect.

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### Corollary Discharge Model

see Defective corollary discharge model for hallucinations.

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### Corona

see Halo.

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### Corona Phenomenon

The term corona phenomenon is indebted to the Latin noun *corona*, which means crown. It was introduced in or shortly before 1966 by the Danish neuroscientists Axel Klee (1933–1982?) and Rolf Willanger to denote a \*visual illusion consisting of an extra edge perceived around objects. The phenomenon itself has been described before, however, and referred to by such terms as \*halo, border, and shiny ring. The German ophthalmologist Christian Georg Theodor Ruete (1810–1867) has been credited with providing the first written account of a corona phenomenon *avant la lettre* in 1845. Corona phenomena typically



**Fig. 5** Corona phenomenon. Illustration by JDB

present in the form of a single or a double contour. They can surround objects in whole or in part, can be executed in any type of colour, including black and white, and may take on a shining, silvery, or shimmering quality. They may occur in isolation, or in association with an incomplete loss of vision (i.e. a \*scotoma), a \*scintillating scotoma, or a complete \*hemianopia. In addition, they may be accompanied by \*geometric hallucinations. Atypical corona phenomena have been described as well, presenting in the form of multiple coloured edges, multiple waves and zigzag lines, coronas surrounding illusory images, or combinations of corona phenomena and other illusory or hallucinatory phenomena such as \*mosaic vision, \*autoscopy, \*polyopia, \*teleopsia, and \*micropsia. Etiologically, corona phenomena are associated primarily with \*migraine aura and with \*sensory deprivation. Their pathophysiol-

ogy is basically unknown, but it has been suggested that they may be mediated by CNS structures involved in visual contrast perception. The corona phenomenon should not be confused with the corona of light associated with \*Buddha's halo, with \*heilighenschein, with the \*visual halo (also known as corona), and with the \*aura featuring in the paranormal literature.

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### Cortical Blindness

see Blindsight.

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### Cortical Metamorphopsia

see Cerebral metamorphopsia.

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### Cortical Probing and Hallucinations

The term cortical probing refers to an experimental method in which cerebral cortical areas are electrically stimulated with the aid of unipolar silver electrodes in order to determine their physiological function. The American physician Roberts Bartholow (1831–1904) has been credited with initiating this type of research shortly before 1874. Arguably the most celebrated work in this domain is that of the Canadian neurosurgeon Wilder Graves Penfield (1891–1976). From the 1930s through the 1950s, Penfield and his group performed open temporal lobe explorations on 520 individuals with uncontrollable epileptic seizures. These individuals were given a local anaesthetic injected into the scalp, so that they remained conscious during the probing experiment, and thus were capable of verbalizing their experiences. Upon the probing of

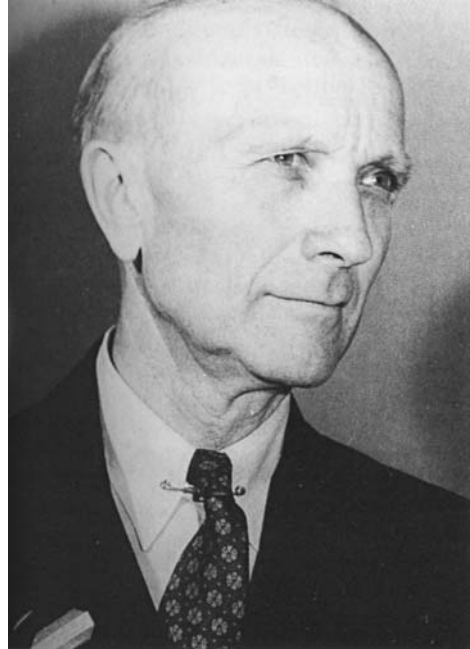


Fig. 6 Wilder Penfield

distinct sensory cortical areas (mostly temporal), 40 of these individuals reported vivid hallucinations. According to Penfield, many of these hallucinations seemed to be re-enactments of previously memorized events. He gives the example of a young South African patient, who “lying on the operating table exclaimed, when he realized what was happening, that it was astonishing to realize that he was laughing with his cousins on a farm in South Africa, while he was also fully conscious of being in the operating room in Montreal.” Throughout his work Penfield refers to hallucinations evoked by cortical probing either as \*experiential phenomena, experiential responses, experiential hallucinations, memory flashbacks, psychical illusions, \*psychical hallucinations, or \*flashbacks. As he considered the sensory cerebral cortex responsible for receiving *and* storing sensory input signals, he conjectured that these hallucinations might well be re-perceived memory traces of prior perceptual experiences (i.e. \*reperceptive hallucinations). He was impressed by their varied, acute, and detailed nature, and

hypothesized that the human memory data base may well contain a literal record of its total conscious experience. He used the terms ganglionic record, neuronal record, and memory cortex to refer to this data base, which he located tentatively within or just beneath the cerebral sensory cortex. In later years, Penfield felt compelled to adjust this view. For example, he moderated his ideas on the alleged completeness of the ganglionic record, on the grounds that certain modes of experience were conspicuously absent from the test persons' reports (such as eating and tasting food, sexual arousal and performance, the execution of skilled procedures, speaking, resolving to do this or that, and memories of pain, suffering, and weeping). Moreover, he realized that memories might well be altered by dream activity *after* their initial recording, and, ironically, by prior instances of re-perception. Therefore, he concluded that re-perceptions could hardly be exact copies of prior sensory experiences. However, he remained convinced that they derived from memorized sense impressions. Long before Penfield's time, the concept behind this physiological model had been conceived by the British physician John Ferriar (1761–1815), who suggested that apparitions might spring from recollections of familiar images. The German psychiatrist Karl Ludwig Kahlbaum (1828–1899) gave this process the name \*re-perception. He dubbed the resulting percepts \*re-perceptive hallucinations, so as to distinguish them from what he called \*perceptive hallucinations. Criticisms of Penfield's cortical hypothesis derive mainly from studies with stereotactically implanted depth electrodes conducted from the 1970s onwards. On the basis of these studies it has been suggested that re-perception can only occur when subcortical as well as cortical centres are activated. As the Swiss-Canadian neurologists Pierre Gloor (1923–2003) et al. state categorically, "Unless limbic structures are activated, either in the course of a spontaneous seizure or through artificial electrical stimulation, experiential phenomena do not occur." Gloor's view concerning the involvement of limbic structures is in keeping with the now dominant long-term potentiation (LTP) model of synaptic transmission, which links memories primarily to alterations in the synaptic transmission of hippocampal neuronal circuits. As a result, Penfield's concept of a 'ganglionic record' within or beneath the cerebral sensory cortex is generally regarded as superseded today. In his final, retrospective work *The Mystery Of The Mind* Penfield indicates that around

1958 he himself had also come to the conclusion that "the record is *not* in the cortex". From that time onwards, he discarded the terms ganglionic record, neuronal record, and memory cortex, and introduced the term interpretive cortex to denote the temporal cortical areas that upon stimulation would mediate experiential phenomena. As he mused accordingly, "Stimulation of the interpretive cortex activates a record located at a distance from that cortex, in a secondary center of gray matter. Putting this together with other evidence makes it altogether likely that the activated gray matter is in the diencephalon (higher brain stem)."

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**Corticosteroids and Hallucinations**

see Steroid psychosis and hallucinations.

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**Craik-Cornsweet Illusion**

see Cornsweet effect.

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**Craik-O'Brien-Cornsweet Illusion**

see Cornsweet effect.

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**Craik-O'Brien Effect**

see Cornsweet effect.

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## Crank Bugs

A term used to denote \*formicative hallucinations (i.e. \*tactile hallucinations mimicking bugs crawling beneath or upon the skin) occurring in the context of amphetamine use or withdrawal. In this specific context, the pruritic lesions resulting from scratching are referred to as speed bumps or meth sores.

### Reference

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## Creative Hallucination

The term creative hallucination stems from the literature on hypnotism. It is used to denote a \*complex or \*compound hallucination prompted by a relatively simple perceptual stimulus in one of the sensory modalities. The Swiss psychologist Carl Gustav Jung (1875–1961) gives an example of “the appearance of hallucinatory processes through simple stimulations of touch.” As Jung maintains, “The patient’s subconscious uses these simple perceptions for the automatic construction of complicated scenes which then take possession of his restricted consciousness.” Creative hallucinations can be classified as a variant of \*reflex hallucinations.

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## Crepuscular Hallucinosis

The term crepuscular hallucinosis is indebted to the Latin noun *crepusculum*, which means dusk or half-light. It is used to denote a hallucinatory state typically arising at dusk, or during any other episode of half-light. The notion of crepuscular hallucinosis should not be confused with the – related – notions of

\*closed-eye hallucination, \*hypnagogic hallucination, and \*hypnopompic hallucination.

### Reference

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## Cross-Activation Hypothesis

In hallucinations research the term cross-activation hypothesis is a generic term for a group of hypothetical models that attribute the mediation of certain types of hallucinations to ‘cross-talk’ between two or more adjacent cerebral areas. The cross-activation hypothesis constitutes one of the major explanatory models for the mediation of \*synaesthesias, i.e. phenomena in which the perceptual stimulation of one sensory modality leads to a hallucinatory experience in a second sensory modality. \*Number-colour synaesthesias, for example, have been tentatively explained by the American neuroscientists Vilayanur S. Ramachandran (b. 1951) et al. as resulting from a genetically determined hyperconnectivity between cerebral colour and number areas. These areas are located within the fusiform gyrus (in so-called ‘lower’ number-colour synaesthetes), or within the angular gyrus (in so-called ‘higher’ number-colour synaesthetes). Theoretically, the cross-activation hypothesis might also be applicable to phenomena such as the \*reflex hallucination, the \*creative hallucination, the \*functional hallucination, and the \*Tullio phenomenon, which are all characterized by a hallucinatory experience occurring in reaction to a regular sense perception.

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## Cryptesthesia

see Clairvoyance.

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## Crystal-Vision

A term used to denote a type of \*visual hallucination or \*illusion that may arise during a period of fixed gazing into an opaque or reflecting object, such as a Braid's crystal, a glass of water, or a metal mirror. The ancient technique employed to call forth this type of hallucination is known as crystal gazing, crystallo-mancy, or scrying. When water or other liquids are employed, the term hydromancy is used. When oil is used, the term lecanomancy applies. It is believed that reflections of light within the medium of choice act as \**points de repère* for the formation of visual hallucinations. In biomedicine, the \*visions thus evoked are variously classified as \*reperceptions or as \*release phenomena. They can also be classified as \*cognitive illusions. The German hallucinations researcher Edmund Parish (1861–1916) holds that crystal-visions are typically experienced while one is fully awake and conscious. It has also been suggested, however, that a trance-like or self-hypnotic state is required to allow these phenomena to be conjured up. In parapsychology, crystallo-mancy is considered a mode of divination. As a corollary, the ensuing hallucinations are considered \*veridical, \*telepathic, or \*coincidental in nature.

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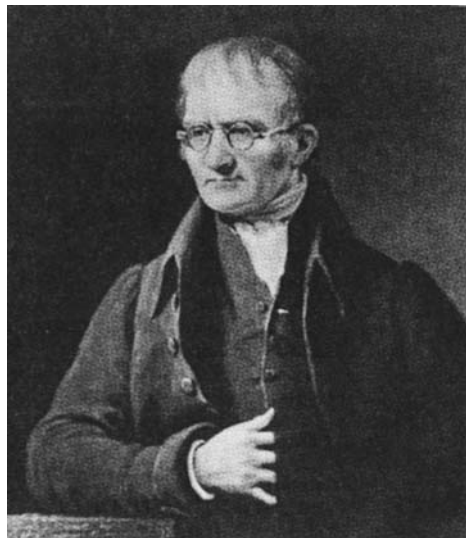
## Cutaneous Perception

see Eyeless vision.

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## Cyanopia

see Cyanopsia.



**Fig. 7** John Dalton. Source: Sterling, W. (1902). *Some apostles of physiology.* London: Waterlow and Sons

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## Cyanopsia

Also known as cyanopia and blue vision. The term cyanopsia comes from the Greek words *kuaneos* (blue) and *opsis* (seeing). It is used to denote a \*chromatopsia (i.e. a temporary aberration of colour vision) in which whites are seen as blue or bluish, and yellows as less intense. As the opposite condition (known as \*xanthopsia or yellow vision) is sometimes caused by cataract of the lens, it is understandable that cyanopsia can occur as a temporary side effect after cataract extraction. Cyanopsia tends to be classified as an \*entoptic phenomenon. The term is used in opposition to the terms \*chloropsia (green vision), \*xanthopsia (yellow vision), \*erythropsia (red vision), and \*ianthiopsia (violet or purple vision).

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# D

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## Daltonism

Daltonism is also known as \*deuteranopia, deutan colour blindness, and deutan colour deficiency. All four terms are used to denote a \*colour vision deficiency of the green–red type. The eponym Daltonism refers to the British chemist and physicist John Dalton (1766–1844), who in 1794 published an account of his own \*colour vision deficiency. As Dalton remarks in this paper, “My yellow comprehends the *red*, *orange*, *yellow*, and *green* of others; and my *blue* and *purple* coincide with theirs. That part of the image which others call *red* appears to me little more than a shade, or defect of light; after that the orange, yellow and green seem *one* colour, which descends pretty uniformly from an intense to a rare yellow, making what I should call different shades of yellow.” In addition to his own colour vision deficiency, Dalton also described those of his brother and 28 other males. He initially referred to his own condition as ‘red-blindness’. However, a genetic analysis of the tissue preserved from his eyes, carried out some 150 years after his death, indicates that it was actually of the green–red type. Dalton was not the first to publish on this type of colour vision deficiency. As early as 1777 it was described by the British hydrographer and engineer Joseph Huddart (1741–1816). Today Daltonism is the most prevalent form of colour vision deficiency. Attributed to an X-linked autosomal condition, it affects

6% of all men, but very few women. The fact that the prevalence of the condition is higher in men than in women was already noted by Dalton. Daltonism can be subdivided into a dichromatic form, called ‘green’ for short, in which the retina’s medium-wavelength cones (M-cones) are missing, and an anomalous trichromatic form, referred to as ‘green weak’, in which the M-cones are present, but in which the peak of the sensitivity for light is displaced towards the red-sensitive cones. Daltonism is commonly classified as an \*entoptic phenomenon. In the past the term Daltonism has also been used as a synonym for the (now obsolete) term \*colour blindness.

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## Dancing Mania and Hallucinations

Dancing mania is also known as dancing plague, epidemic of dancing, epidemic chorea, and choreomania. According to historical sources, the



latter term was introduced by Theophrastus Bombastus von Hohenheim, better known as Paracelsus (1493–1541). All the above terms are used to denote a complex motor phenomenon that occurred throughout Western Europe from the 14th through the 17th century. In dancing mania, groups of people would dance in the streets, displaying hallucinatory behaviour, epileptiform fits, and transient paralyses, until they collapsed from exhaustion. According to the French alienist Louis-Florentin Calmeil (1798–1895), the dancers often reported religious and/or terrifying \*visions. The first major outbreak of dancing mania is thought to have taken place in Aachen, Germany, on June 24, 1374, after which it spread quickly through France, Italy, Belgium, Luxemburg, the Netherlands, and even Madagascar. It appears to have reached its peak in 1418 in Strasbourg. Because the religious treatment of the condition involved praying to St. Vitus (amongst many other things), the condition has been erroneously referred to as St. Vitus Dance (a term that actually refers to Sydenham's chorea). Paradoxically, dancing mania was also treated by means of music. As to the condition's etiology, no real consensus exists. Post hoc hypotheses range from mass hysteria to encephalitis, epilepsy, the bite of a Tarantula, murine typhus, and ergot poisoning. A well-known case of dancing mania in Aix-la-Chapelle, France, has been attributed to ergot poisoning (known in the Middle Ages as St. Anthony's Fire) due to the ingestion of rye infected with ergot (*Claviceps purpurea*), a fungus that produces alkaloids with a hallucinogenic potential. The reason that the occurrence of dancing mania was restricted to this specific geographical area and time frame is unknown.

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## Dancing Plague

see Dancing mania.

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## Dark Light

see *Eigengrau*.

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## Dark Side of Oz

see Dark Side of the Rainbow.

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## Dark Side of the Rainbow

Also referred to as *Dark Side of Oz* and *Wizard of Floyd*. The name *Dark Side of the Rainbow* is a contraction of the 1973 album title *The Dark Side of the Moon* by the British rock band Pink Floyd, and the song title *Over the Rainbow* from the sound track of the 1939 film *The Wizard of Oz*. In addition, it has been suggested that it refers to the colours of the rainbow featured on the cover of the Pink Floyd album. The term *Dark Side of the Rainbow* denotes a peculiar pattern of thematic similarities that can be discerned while one is watching *The Wizard of Oz* while simultaneously listening to *The Dark Side of the Moon*. With the aid of this somewhat unusual procedure, over a hundred instances of perceived interplay have been reported by fans. It is not known who first established this pattern of thematic similarities, but from 1994 onwards it was widely discussed on internet sites such as the Usenet message board *alt.music.pink-floyd* and in the popular media. As the Pink Floyd band members (save Roger Waters) have always denied deliberate attempts to synchronize their album with the movie, the *Dark Side of the Rainbow* is commonly designated as a \*cognitive illusion and attributed to a process called \*apophenia, i.e. an excess of perceptual or heuristic sensitivity leading to the discernment of patterns or connections in random or meaningless data. Similar thematic coincidences have been described between other movies and rock albums, but none of these are as elaborate or as well aligned as the *Dark Side of the Rainbow*.

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## Datura Hallucination

Datura is known under many names, including apple-Peru, angel's trumpet, devil's trumpet, devil's weed, devil's cucumber, hell's bells, jimsonweed, pricklyburr, toloache, and thornapple. Etymologically, the Latin name *datura* is thought to stem from the Hindi or Old Indian name *dhattūra*, which means thornapple. It covers a genus of some 11 species of vespertine flowering plants belonging to the family *Solanaceae*. The term datura hallucination is used to denote a variety of hallucinatory phenomena mediated by the use of preparates from species such as *Datura stramonium*, *Datura discolor*, and *Datura wrightii*. These species contain the powerful tropane alkaloids atropine, hyoscyne (i.e. scopolamine), and hyoscyamine. They have been used since ancient times as an \*entheogen, an aphrodisiac, a therapeutic, an anaesthetic, and a poison. Today a person intentionally employing datura for the purpose of exploring the psyche may be called a \*psychonaut. Using the criterion of psychoactive potential as a guiding principle, datura is usually classified as a \*deliriant. As to its effects, the German anthropologist and ethnopharmacologist Christian Rättsch (b. 1957) maintains that "The Indian division into three stages has particular relevance here: A mild dosage produces medicinal and healing effects, a moderate dosage produces aphrodisiac effects, and high dosages are used for shamanic purposes." The symptoms of datura intoxication are quite similar to those of atropine intoxication. They include mydriasis, blurred vision, tachycardia, vertigo, a sense of suffocation, an extremely dry throat, constipation, urinary retention, \*illusions, hallucinations, \*delirium, sopor, and ultimately respiratory failure, coma, and death. Pathophysiologically, these symptoms are attributed to the inhibition of the action of acetylcholine at the acetylcholine receptor in the nerve synapse, thereby blocking the physiological function of the parasympathetic nervous system. Today datura is occasionally used for recreational purposes, at considerable risk of accidental overdosing. It is either smoked, ingested raw or consumed in the form of a tea. In all cases, datura is reputed to medi-

ate vivid \*visual or \*compound hallucinations. The content of these hallucinations is described as either metaphysical, or quite banal. The Canadian anthropologist and ethnobotanist Edmund Wade Davis (b. 1953) lists datura as one of the possible ingredients of a potion believed to evoke an extreme form of \*twilight state, called zombification.

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## David's Definition of Hallucinations

In 2004 the British neurologist and psychiatrist Anthony S. David (b. 1958) defined hallucinations as follows. "A sensory experience which occurs in the absence of corresponding external stimulation of the relevant sensory organ, has a sufficient sense of reality to resemble a veridical perception, over which the subject does not feel s/he has direct and voluntary control, and which occurs in the awake state."

## Reference

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## Day Blindness

see Hemeralopia.

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## Daydream

Also referred to as waking fantasy, \*oneirism, and reverie. The term daydream tends to be used

quite loosely to denote a fantasy or memory played out in the imagination. Daydreams generally consist of imagined or remembered scenes or conversations. As noted by the American psychologist Mary Maria Watkins (b. 1950), "In daydreaming, the ego's attention becomes attached to the imaginal contents in the same way it does to our daily concerns. There is no awareness during it or memory afterward of what was going on. One could say that daydreams are a form of sleeping wakefulness, as opposed to the state of wakefulness even while sleeping that characterizes a waking dream." By definition, daydreams lack the perceptual quality of \*dreams and \*hallucinations. Nevertheless, they can be so lively and distracting that they drown out the regular stream of sensory input. Or, alternatively, they can arise as a consequence of diminished or depatterned sensory input. As the Scottish physician Robert MacNish (1802–1837) wrote in 1830, "Reverie proceeds from an unusual quiescence of the brain, and inability of the mind to direct itself strongly to any one point; it is often the prelude of sleep. There is a defect in the *attention*, which, instead of being fixed on one subject, wanders over a thousand, and even on these is feebly and ineffectively directed." Daydreams can occur either spontaneously or intentionally. They tend to be experienced as purposeless in nature, but they can also be used in a goal-directed manner. In psychology, daydreaming styles are labelled as either positive-constructive, or as guilty and fearful. Daydreams may occasionally develop into a \*daymare, especially in subjects plagued by recurring \*nightmares. More often, however, they constitute a prelude to a \*microsleep, \*hypnagogic state, or sleep state. The term daydream is used in opposition to the terms dream, sleep dream, and nocturnal dream. It should not be confused with the terms \*dreamy state, absence, absence seizure, or \*hypnagogic hallucination.

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## Daymare

Also known as \*ephaltes vigilantium. The term daymare is indebted to the Old English noun *mare*, which means hag or goblin. It is used to denote an episode of acute anxiety, distress, or terror occurring during a period of wakefulness, which is often precipitated by a \*daydream or a fantasy. Conceptually and phenomenologically, the daymare is considered the daytime equivalent of the \*nightmare. The American psychiatrist and sleep researcher Ernest Hartmann (b. 1934) characterizes the daymare as "A daydream which becomes increasingly frightening and 'nightmarish' so that it frightens the daydreamer much as a nightmare awakens the dreamer at night. A rare phenomenon, but described by many persons with frequent nightmares." In the past, the phenomenological similarity between the daymare and the classical nightmare has brought some authors to designate the daymare as an \*incubus experience taking place during wakefulness, characterized by the same peculiar pressure on the chest that is characteristic of the nocturnal variant. In 1830 the Scottish physician Robert MacNish (1802–1837) gave the following colourful autodescription of a daymare. "During the intensely hot summer of 1825, I experienced an attack of daymare. Immediately after dining, I threw myself on my back upon a sofa, and, before I was aware, was seized with difficult respiration, extreme dread, and utter incapability of motion or speech. I could neither move nor cry, while the breath came from my chest in broken and suffocating paroxysms. During all this time, I was perfectly awake: I saw the light glaring in at the windows in broad sultry streams; I felt the intense heat of the day pervading my frame; and heard distinctly the different noises in the street, and even the ticking of my own watch, which I had placed on the cushion beside me. I had, at the same time, the consciousness of flies buzzing around, and settling with annoying pertinacity upon my face. During the whole fit, judgment was never for a moment suspended. I felt assured that I laboured under a species of incubus. I even endeavoured to reason myself out of the feeling of dread which filled my mind, and longed with insufferable ardour for some one to open the door, and dissolve the spell which bound me in its fetters. The fit did not continue above 5 min: by degrees I recov-

ered the use of speech and motion: and as soon as they were so far restored as to enable me to call out and move my limbs, it wore insensibly away. Upon the whole, I consider daymare and nightmare identical. They proceed from the same causes, and must be treated in a similar manner." Elsewhere MacNish states, however, that "The only difference which [would] seem to exist between the two states is, that in daymare, the reason is always unclouded – whereas in incubus it is *generally* more or less disturbed." Although MacNish was apparently convinced that his judgment had remained unaffected throughout the entire episode, it is not unthinkable (in retrospect) that he had actually experienced an episode of \*microsleep.

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## De Clérambault Syndrome

The eponym de Clérambault syndrome refers to the French psychiatrist Gaëtan Georges Gatian de Clérambault (1852–1934). It was introduced in 1936 by the Swiss neurologist Georges de Morsier (1894–1982) to denote a hallucinatory state or syndrome characterized by \*auditory and \*visual hallucinations occurring in the context of chronic \*psychosis, which had previously been described by de Clérambault in the context of his work on mental \*automatisms. It should be noted that the eponym de Clérambault syndrome is also used to denote a delusional syndrome characterized by erotomania.

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## De Maupassant, Guy (1850–1893)

A French writer – considered one of the fathers of the short story – who described various types of hallucination in his literary works. It is known that de Maupassant used \*hallucinogens throughout his adult life, that he suffered from visual loss, migraine, and neurosyphilis (possibly complicated by stroke), and that he spent the last months of his life in a state of \*delirium. It has been suggested that throughout his working life he drew on his own hallucinatory experiences for his fantastical stories. Careful analyses of his biography and literary works indicate that until the early 1880s de Maupassant experienced \*hypnagogic hallucinations, \*hypnopompic hallucinations, and \*drug-induced hallucinations, while during his later years he also experienced \*visual hallucinations, \*autosopic phenomena, and \*metamorphopsias (including \*prosopometamorphopsia and \*macropsia). It has been suggested that the latter symptoms fulfilled the criteria of the \*Alice in Wonderland syndrome. During the delirious state in which he spent the final months of his life, de Maupassant may also have experienced other types of hallucination. The import of his work for hallucinations research lies in the combination of a first-hand acquaintance with hallucinatory phenomena, and an exceptional talent for verbalizing and analyzing them. This combination places him in a league with other hallucinating intellectuals, such as Victor Kandinsky (1849–1889), Daniel Paul Schreber (1842–1911), John Thomas Perceval (1803–1876), Christoph Friedrich Nicolai (1733–1811), Vaslav Nijinsky (1889–1950), Fjodor Dostoevsky (1821–1881), and Ludwig Staudenmaier (1865–1933).

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## Dead-Weight Hallucination

A term introduced in or shortly before 1951 by the American neurologist Caro W. Lippman

(1886–1954) to denote a \*kinaesthetic hallucination characterized by a subjective sensation of being pulled down to the ground. As noted by one of Lippman's patients, "While walking I have a feeling as if a rope were attached between my legs, pulling me down into the ground. At other times I have a feeling of being near to the ground, squashed down, my whole body mashed." Lippman classifies dead-weight hallucinations as variants of the \*space-motion hallucination. Because of their association with migraine, they may also be classified as \*aural phenomena.

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### Deafferentiation Hypothesis of Hallucinatory Activity

The term deafferentiation is indebted to the Latin words *de* (away from, 'negation'), and *affere* (to take somewhere, to bring somewhere). The deafferentiation hypothesis of hallucinatory activity is a hypothetical model that seeks to explain the mediation of some types of hallucination by reference to an endogenous type of \*sensory deprivation attributed to disruptions in neural connectivity. It postulates that spontaneous hallucinatory activity can be mediated by sensory cortical areas when these are deafferentiated, i.e. when they are cut off from the neurons and/or axons conducting afferent sensory impulses. This hallucinatory activity is attributed to massive degeneration and subsequent reorganization taking place in the cortical termination zones, as well as in the primary non-affected subfields of the sensory cortex. It is generally held that deafferentiation of primary sensory cortical areas may entail the spontaneous mediation of relatively \*simple hallucinations, whereas deafferentiation of cortical association areas may entail the spontaneous mediation of \*complex hallucinations. The deafferentiation hypothesis has been employed as an explanatory model for various types of hallucinations, including the \*visual hallucinations occurring in the context of \*Charles Bonnet syndrome, \*hemianopic hallucinations, \*verbal auditory hallucinations, \*musical hallucinations,

\*olfactory hallucinations, \*deafferentiation pain, \*anaesthesia dolorosa, and \*phantom limb illusion. Conceptually, the deafferentiation hypothesis of hallucinatory activity is indebted to early 19th-century deafferentiation models of sleep, such as those of the Italian anatomist Luigi Rolando (1773–1831).

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### Deafferentiation Pain

Also known as neural injury pain. The term deafferentiation pain is indebted to the Latin words *de* (away from, 'negation'), and *affere* (to take somewhere, to bring somewhere). It is used, especially in the older literature, to denote a type of pain attributed to a disruption of neural connectivity, due to the severance of afferent axons and/or neurons (i.e. deafferentiation). Phenomenologically, deafferentiation pain can present in the form of \*hyperaesthesia, \*hyperpathia, \*allodynia, \*phantom pain, \*causalgia, and spontaneous pain. Although deafferentiation pain has sometimes been lumped together with \*central pain on the basis of 'common clinical features', the two syndromes are distinctly different. It has been suggested that the terms deafferentiation pain and neural injury pain are confusing, and that they should perhaps be discarded altogether for clinical purposes. The question of whether pain can also be experienced in a hallucinated form is a knotty philosophical issue.

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## Deafness

see Hearing loss and hallucinations.

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## Deathbed Apparition

see Take-away apparition.

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## Deathbed Escort

see Take-away apparition.

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## Deathbed Vision

A term used to denote a \*visual or \*compound hallucination occurring shortly before dying. Deathbed visions have been known and described since ancient times. The first systematic study of these phenomena was carried out between 1924 and 1926 by the founder of the Society for Psychical Research, the British physicist William Fletcher Barrett (1844–1925). It was also Barrett who introduced the term deathbed vision in 1926. In a study conducted between 1959 and 1973 by the \*American Society for Psychical Research, represented by the parapsychologists Karlis Osis (1917–1997) and Erlendur Haraldsson (b. 1931) among tens of thousands of individuals in the United States and India, deathbed visions were found to occur in 50% of the population under study. Reportedly, these visions tend to involve either deceased loved ones, other individuals, or

mythical or religious figures. In the literature, visions depicting an otherworldly messenger are addressed as \*afterlife-related hallucinations and as hallucinatory near-death experiences. Because of their alleged role in summoning or escorting the individual from this world to the afterlife, such figures are also designated as deathbed escorts, deathbed apparitions, or \*take-away apparitions. They are sometimes described by the dying person as an unusual light or energy. Deathbed visions may also depict scenes associated with an afterworld. Such scenes typically involve radiant lines, luminous gardens, buildings of great architectural beauty, and symbolic transitional structures such as doors, gates, bridges, death-coaches, rivers, and boats. The afterworld scenes may be populated with angels or humanoid figures. They tend to be reported as being executed in glowing, bright colours. Sometimes celestial music is reported as well. When visions of such scenes replace the whole sensory environment, they are referred to as \*total hallucinations. When they are accompanied by a compelling sense of objectivity, they are said to have a high degree of \*xenopathy. Deathbed visions may resemble \*ecstatic experiences (i.e. ‘the psycho-physical condition that accompanies the apprehension of what one experiences as the ultimate reality’) in that they may summon up feelings of great peace, and/or a feeling of unity with God or with Creation. The duration of such deathbed visions varies. About half of those reported by Osis and Haraldsson lasted 5 min or less. Some 17% lasted between 6 and 15 min. Three quarters of the individuals under study died within 10 min after their vision, and almost all of them died within hours afterwards. Pathophysiologically, deathbed visions tend to be conceptualized either as \*release phenomena, or as \*reperceptions. To suspend judgement on the issue of whether the perceived otherworldly figures exist or not, it has been proposed to use the neutral term \*idionecrophany to denote any sensory experience that involves an alleged contact with the dead. It has also been suggested that the experience of a ‘clear light of death’ may be associated with the massive release of the neurotransmitter dimethyltryptamine (DMT).

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## Defective Corollary Discharge Model for Verbal Auditory Hallucinations

This is a term used to denote a variant of the \*inner speech model for \*verbal auditory hallucinations (VAH) that seeks to explain the misattribution of inner speech – which is deemed to underlie the mediation of (some types of) VAH or ‘voices’ – by reference to a default in corollary discharge. In this context the term corollary discharge refers to an early-warning signal (also known as feedforward signal or efference copy) purportedly sent by the speech production areas to the speech perception areas via the fronto-cingulo-temporal (FCT) circuit. The function attributed to this corollary discharge consists in ‘preparing’ the speech perception areas and/or the auditory cortex for an endogenous signal to come, thus allowing these structures to distinguish between self-mediated and externally mediated signals. As postulated by the British psychologist and neuroscientist Christopher Frith (b. 1942) and others, a failure in this type of corollary discharge can lead to the misattribution of inner speech to an external source. Conceptually, the defective corollary discharge model for hallucinations is a derivative of the CODAM model developed by the British mathematician John Gerald Taylor (b. 1931), which in turn constitutes an elaboration of the work of the American philosopher Sydney Shoemaker (b. 1931) on self-reference and self-awareness. CODAM is an acronym for COrollary Discharge of Attention Movement. The CODAM model postulates that the general deployment of attention, as well as the creation of consciousness, depend primarily on the ability of the brain (or mind) to predict its own future state, and that this ability is created by an efference copy or corollary discharge of the attention control signal.

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## Defective Revisualization

see Charcot–Wilbrand syndrome (CWS).

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## Deformation Phosphene

Also known as pressure phosphene. The two terms are used interchangeably to denote a type of \*phosphene (i.e. ‘seeing stars’) that can be provoked under physiological conditions by the exertion of gentle pressure on the eyeball. Deformation phosphenes are classified as \*entoptic phenomena. They may present as a darkening of the visual field, as diffuse colour patches, as changing, scintillating, and deforming light-grids with occasional dark spots, or as a field that is sparsely covered with intense blue points of light. The earliest known description of the deformation phosphene was recorded by the Greek philosopher and medical theorist Alcmaeon of Croton, who lived in the mid-fifth century BC. Under the influence of \*hallucinogens such as mescaline and LSD, the induction of deformation phosphenes can trigger a kaleidoscopic series of \*visual hallucinations.

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## Déjà Experience

The French-English neologism *déjà* experience translates loosely as ‘already experience’.

It is used as a generic term for the group of false memory phenomena exemplified by \**déjà vu*. Although to the affected individual these phenomena may be suggestive of a perceptual aberration, they are generally conceptualized as mnestic events. According to the South African *déjà vu* expert Vernon M. Nepe, over 20 different *déjà* experiences can be distinguished. These include *déjà arrivé* (already happened), *déjà connu* (already personally known), *déjà dit* (already said or spoken (i.e. speech content)), *déjà entendu* (already heard), *déjà éprouvé* (already experienced), *déjà fait* (already done), *déjà goûté* (already tasted), *déjà lu* (already read), *déjà parlé* (already spoken (i.e. speech act)), *déjà pensé* (already thought), *déjà pressenti* (already sensed), *déjà raconté* (already recounted), *déjà rencontré* (already met), *déjà rêvé* (already dreamt), *déjà senti* (already felt or smelt), *déjà su* (already known), *déjà trouvé* (already found), *déjà vécu* (already lived), *déjà visité* (already visited), *déjà voulu* (already desired), and *déjà vu* (already seen, as used in the restricted sense of having perceived in the visual modality). Conceptually, the *déjà* experiences are considered the opposite pole of \**jamais vu* (never seen). A third variant is known as \**presque vu* (almost seen).

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### Déjà Vu

Also known as false memory. The term *déjà vu* is French for ‘already seen’. As pointed out by the South African *déjà vu* expert Vernon M. Nepe, the term is used in a broad sense to denote “any subjectively inappropriate impression of familiarity of a present experience with an undefined past” (i.e. as a synonym of the generic term \**déjà* experience), and in a narrow sense to denote a \**déjà* experience occurring in the visual modality. As used in the latter sense, the term *déjà vu* is used in opposition to more than 20 related terms, such as *déjà arrivé* (already happened), *déjà connu* (already personally known), and *déjà*

*entendu* (already heard). As used in the broad as well as the narrow sense, *déjà vu* is considered the obverse of \**jamais vu*. The origin of the term *déjà vu* is unclear, but it is sometimes attributed to the French philosopher and psychologist Émile Boirac (1851–1917), who reportedly mentioned it in 1876 in a letter to the French journal *Revue Philosophique de la France et de l’Étranger*. The concomitant concept, however, would seem to be much older. It has been suggested that the Church Father St. Augustine (354–430) referred to this phenomenon when he used the term *falsae memoriae* in his work *De Trinitate*. Although the term *déjà vu* may seem to suggest otherwise, this symptom is not conceptualized as a perceptual phenomenon but as a false, but compelling sense of familiarity or recognition (i.e. a mnestic event) that may accompany a regular perceptual experience or event. For example, one may walk into a restaurant, and observe the other guests sitting at their dinner tables, and have the feeling that one has witnessed that exact scene before. Pseudo-presentiments like these would seem to be fairly common in healthy individuals of all ages. They typically last for various seconds to minutes, without affecting the subjects’ judgment of their present situation. The subject’s feeling is rather characterized by the cognitive dissonance between the feeling of re-experiencing a given situation, and the simultaneous awareness of its impossibility. Epidemiological surveys indicate that the lifetime prevalence of *déjà vu* experiences in the non-institutionalized population lies between 30 and 96%. This broad range of prevalence figures is probably due to differences in the operational criteria of *déjà vu*, and to population biases. The literature also suggests that the incidence of *déjà vu* may be higher in young and imaginative individuals, and that its incidence tends to increase in the context of conditions such as fatigue and heightened perceptual sensitivity. Some studies also suggest that *déjà vu* may be more prevalent among individuals with a psychiatric disorder, such as anxiety disorder, dissociative identity disorder, mood disorder, personality disorder, or \*schizophrenia. In addition, a heightened incidence of *déjà vu* is associated with the organic brain syndrome, temporal lobe epilepsy, Alzheimer’s disease, and other types of dementia. When *déjà vu* is attributed to an organic cause, it is referred to as endogenous *déjà vu*. In the case of a specific association with epilepsy, the phenomenon is sometimes referred to as epileptic \**aura* or epileptic



*déjà vu*. Epileptic *déjà vu* typically presents as a *déjà vu* phenomenon with a prolonged or recurrent course. It can be complicated by hallucinatory phenomena such as \*abdominal aura and olfactory hallucinations, and by subjective phenomena such as derealization, depersonalization, and strong affective states. As to the pathophysiology of *déjà vu*, various competing models exist. Most of these revolve around the notion of a dissociated activation of the familiarity/memory-centres of the brain, as may occur in dysfunctional activation of the mesial temporal lobe. In the literature this dysfunctional activity is conceptualized as epileptic in origin or not. Alternatively, the dual pathway hypothesis suggests that perceptual information from the senses does not always converge on sensory cortical areas in a coordinated fashion, thereby luring the cortex into labelling a single percept as a duplicated (i.e. re-experienced) one. As the alleged delay in neurotransmission is thought to originate from the optic nerve, the concomitant model is referred to as the optical pathway delay hypothesis. A third hypothesis suggests that *déjà vu* may arise from an instance of unattended perception, followed by an instance of attended perception. In parapsychology, *déjà vu* and other *déjà* experiences are sometimes regarded as telepathic phenomena, or as veridical memories of an alleged past life.

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### Deliriant

Also known as true hallucinogen and anticholinergic hallucinogen. The term deliriant comes from the Latin verb *delirare*, which means to go off the furrow, to derail. It is used to denote a subclass of the \*hallucinogens characterized by the ability to induce a state of acute \*delirium. Such acute states can be accompanied by a variety

of symptoms, including hallucinations, restlessness, agitation, and fugue states. Some examples of deliriants are alkaloids such as belladonna, mandrake, henbane, datura, atropine, and scopolamine, and antihistaminics such as diphenhydramine and dimenhydrinate. The mode of action of the deliriants is thought to be through inhibition of the action of acetylcholine in the CNS. The term deliriant is used in opposition to the terms \*psychedelic and \*dissociative. In some classifications, the deliriants are considered a subgroup of the dissociatives. A person intentionally employing deliriants for the purpose of exploring the psyche may be called a \*psychonaut.

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### Delirious Hallucination

A term used – and possibly also introduced – in 1973 by the French psychiatrist Henri Ey (1900–1977) to denote a hallucination occurring in the context of disease. Conceptually, Ey's notion of *hallucination délirante* would seem to resemble the \*pathological hallucination of his compatriot Alexandre Jacques François Briere de Boismont (1797–1881). Ey uses the term *hallucination délirante* – or hallucination, for short – in opposition to the term \**éidolie hallucinosique*.

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### Delirium

Also known as acute confusional state, acute organic reaction, acute brain syndrome, confusional state, and toxic-metabolic encephalopathy. The term delirium comes from the Latin verb *delirare*, which means to go off the furrow, to derail. The term was used in the Hippocratic Corpus and other ancient medical texts with a variety of connotations, mostly revolving around the notion of a disturbance in the train of thinking. The various contexts in which the term was used are often epistemologically discontinuous with current medical thinking. During the first part of the 19th century (and especially in the French

medical literature) the term delirium (*délire*) was used for a variety of mental states, including those characterized by disorders of intellectual function, errors of judgment (i.e. delusions), and perceptual disturbances (such as hallucinations). For a long time, delirium was distinguished from mental illness by the presence of fever. It was the French alienist Alexandre Jacques François Briere de Boismont (1797–1881) who in 1845 made an important contribution to the syndromatic approach which is in use today by suggesting that delirium should be conceptualized as an acute, prototypical type of insanity. Today the term delirium is used to denote a heterogeneous mental and neurobehavioural syndrome which is by definition associated with organic disease, although not necessarily with fever. As to its symptomatology, delirium is characterized primarily by alterations in the level of consciousness (i.e. ‘clouding’), and by a disorientation in time and space. Additional symptoms may include attention deficits, impairments of cognitive functioning, delusions, hallucinations, \*illusions, speech disorders, an altered sleep-wake cycle, and behavioural symptoms such as restlessness, agitation, disrobing, plucking, physical aggression, and wandering. The hallucinations and illusions occurring in the context of delirium are primarily of a \*visual nature, although the other sensory modalities may be involved as well. \*Zoopsia and \*formicative hallucinations are considered classical symptoms. The term \*delirium tremens is reserved for delirious states occurring in the context of alcohol withdrawal.

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## Delirium of Judgment

The German term *Urtheilsdelirien* (i.e. delirium of judgment) was introduced in or shortly before 1885 by the Russian psychiatrist Victor Kandinsky (1849–1889) to denote a type of

\*illusion in which perceptual stimuli or objects are misinterpreted rather than misperceived. Some examples of delirium of judgment are cases in which pebbles are held for gems, or pieces of simple metal for silver or gold. The notion of delirium of judgment is conceptually compatible with the notion of \*ganglionic illusion as defined by the French alienist Jean-Etienne Dominique Esquirol (1772–1840). Although illusions are generally conceptualized as perceptual phenomena, the term delirium of judgment would seem to refer to a delusional rather than an illusory phenomenon. As Kandinsky points out, this is a common, but not a proper usage of the term illusion, the origin of which can be traced back to Esquirol. Kandinsky uses the notion of delirium of judgment in opposition to the notions of \*sensory misperception (*Sinnestäuschung*) and \*delirium of the senses (*Sinnesdelirien*).

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## Delirium of the Senses

The German term *Sinnesdelirien* (i.e. delirium of the senses) was introduced in or shortly before 1885 by the Russian psychiatrist Victor Kandinsky (1849–1889) to denote a type of \*illusion commonly designated as \*intermetamorphosis (i.e. *Personenverwechslung* in German). This type of illusion typically involves a situation in which an individual is regularly and consistently misidentified, and taken for a different person. This consistent misidentification is explained by Kandinsky in terms of a \*pareidolia based on the distinctive facial features that two (or more) persons may have in common. In Kandinsky's own words, “Delirium of the senses is an external state of affairs, and mostly a singular, highly specific one, that calls forth the percept at hand. Should we not assume that the images of the individual persons that call forth these cases of mistaken identity correspond in various characteristic ways with the images of the true persons? And

that that is why the complete, objective image and the schematic, subjective image fall into the same place, and why the mistake is thus called forth by an event that belongs to the process of sense perception?" Kandinsky uses the term delirium of the senses in opposition to the terms \*sensory misperception (*Sinnestäuschung*), and \*delirium of judgment (*Urtheilsdelirien*). Conceptually and in a classificatory sense, the delirium of the senses occupies a sort of middle ground – or perhaps one should say a common ground – between hallucination and illusion. As Kandinsky explains, "This type of illusion, the perceptual interchange delirium, as distinct from the cognitive interchange delirium, is therefore basically also a hallucination, distinguishing itself from the more regular hallucination only because the inner impulse, the inner anomaly is not sufficient for its occurrence, and that a certain exterior impulse must be added, so that the hallucination is not a complete one, but only a partial one." In a later passage Kandinsky adds that the term delirium of the senses also has a bearing on objects, and proposes that the term pareidolia be used as a generic term for all the various kinds of 'partial' hallucinations.

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### Delirium Tremens

Also known as shaking delirium and Saunders-Sutton syndrome. The term delirium comes from the Latin verb *delirare*, which means to go off the furrow, to derail. The adjective *tremens* is Latin for trembling or shaking. The expression delirium tremens is used to denote a subtype of \*delirium that may occur following the cessation of a prolonged and excessive intake of alcohol, benzodiazepines, barbiturates or other tranquilizers. The term was introduced in 1813 by the British physician Thomas Sutton (1767–1835), who used it to demarcate the concomitant cluster of symptoms from other types of delirium, as well as from other alcohol withdrawal syndromes. The eponym Saunders-Sutton syndrome refers to Sutton and to his Scottish colleague Willam Saunders (1743–1817), who had lectured

on the subject, and gave Sutton advice while he was preparing his original paper on the subject. According to the historians of psychiatry Gregory Zilboorg (1890–1960) and George W. Henry (1890–1964), the symptoms characteristic of delirium tremens have been known since prehistoric times, as has their association with alcohol withdrawal. The clinical symptoms of delirium tremens include tremor, tachycardia, tachypnea, either hypertension or hypotension, increased perspiration, an alteration of body temperature, gastritis, vomiting, disorientation, hyperkinesia, anxiety, panic attacks, agitation, insomnia, food aversion, confabulations, paranoia, hallucinations, \*illusions, \*paraesthesias, epileptic seizures, and coma. The hallucinations occurring in the context of delirium tremens are primarily of a \*complex visual or \*compound nature. They tend to consist of vivid, terrifying images of people, animals (i.e. \*zoopsia) or insects that can be felt crawling upon or beneath the skin (i.e. \*formication). A special type of visual hallucination described in the context of delirium tremens that can be evoked by the covering of one eye is the \*monocular hallucination. As pointed out by the Swiss psychiatrist Ferdinand Morel (1888–1957), many of the \*visual illusions (and perhaps also hallucinations) in delirium tremens are associated with the presence of a positive \*scotoma, which can be described adequately by the affected individual during sober phases, but which may act as a \*point de repère for their development when consciousness is clouded. The symptoms of delirium tremens typically arise several days to a week after the cessation of a prolonged episode of excessive alcohol intake. Without adequate treatment these symptoms may last for several weeks. As noted by 19th-century authors, untreated delirium tremens is always self-limiting, in the sense that it ends either in spontaneous recovery or death. The mortality rate of untreated delirium tremens is estimated to lie between 15 and 40%. Even with adequate treatment, the mortality rate is between 1 and 15%. The pathophysiology of delirium tremens is largely unknown, but it is attributed mainly to the central effects of alcohol on the benzodiazepine-GABA<sub>A</sub>-chloride receptor complex for the neurotransmitter gamma amino butyric acid (GABA). The high mortality rate is associated primarily with comorbid conditions such as hyperthermia, dehydration, vitamin depletion, electrolyte disturbances, cardiac arrhythmia, cardiac failure, and hepatic coma.

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## Delusional Halitosis

see Hallucinatory halitosis.

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## Delusional Misidentification Syndrome

see Misidentification syndrome.

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## Delusional Reduplication Syndrome

see Misidentification syndrome.

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## Dementia and Hallucinations

The term dementia comes from the Latin words *de* (away from, apart) and *mens* (mind). It is used to denote a generalized, pervasive decline in cognitive functioning to an extent which is beyond what can be expected in normal ageing, and which leads to a significant interference with the affected individual's daily functioning, social functioning, and/or occupational activities. Etiologically, dementia is associated primarily with a variety of CNS diseases, including Alzheimer's

disease, cerebrovascular disease (leading to vascular dementia), Pick's disease, Parkinson's disease (i.e. Lewy body dementia), Huntington's disease, \*Aids (leading to the Aids-dementia complex), Creutzfeldt-Jakob disease, alcoholism (leading to alcoholic dementia), and substance abuse. Among the hallucinations occurring in the context of dementia, the \*visual and \*auditory ones are the most prevalent. However, hallucinations in dementia may occur in any of the other sensory modalities as well. Hallucinations and illusions in dementia usually arise after the characteristic process of cognitive impairment has set in, but occasionally they constitute the disease's presenting symptom. For more specific details, see the entry Alzheimer's disease and hallucinations.

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## Dementia Paralytica and Hallucinations

see Syphilitic hallucinosis.

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## Demon

The term Demon comes from the Greek noun *daimōn*, which means spirit or god. It was introduced into the biomedical jargon during the early 1970s by the American psychopharmacologist Ronald K. Siegel to denote a visually hallucinated black gauzy curtain with a large human eye in the centre, surrounded by a symmetrical arrangement of smaller eyes. The term Demon, suggested to Siegel by a test person referred to as 'Jim', was inspired by a passage from *The Pit and the Pendulum* by the American author and poet Edgar Allan Poe (1809–1849) which runs as follows. "Demon eyes, of a wild and ghastly vivacity, glared upon me in a thousand directions where none had been visible before, and gleamed with the lurid lustre of a fire that I could not force my imagination to regard as unreal." Like the eyes described in Poe's \*vision, the hallucinated eyeballs are described as "alive, leering". In Siegel's laboratory they were perceived by various test persons during \*cannabis-induced visions,



**Fig. 1** Demon. Illustration by JDB

while a more or less similar phenomenon has been described in \*hallucinogen-induced visions, and in individuals with a clinical diagnosis of \*schizophrenia. Despite Siegel's efforts to fathom the neurophysiological correlate of the Demon (including a trip to a Mexican shaman said to be over a 100 years old) he was unable to find any explanation other than the possibility of a \*reperceptive hallucination based on a slide with geometrically arranged eyes that had previously been shown to the test persons. It is unknown whether this mechanism also applies to other manifestations of the Demon phenomenon. The term is also used in religion, demonology, occultism, and parapsychology to denote a super-

natural being that is not a deity, i.e. a fallen angel or evil spirit.

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#### Demoor's Sign

see Charpentier's illusion.

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## Dendropsia

The term dendropsia comes from the Greek words *dendron* (tree) and *opsis* (seeing). It was coined in or shortly before 1999 by the British neuroscientists Dominic H. ffytche and Robert J. Howard to denote a \*geometric hallucination consisting of irregular branching forms reminiscent of trees, branches, or roadmaps. These hallucinated branching forms are executed in one or more colours, and occasionally display adnexes reminiscent of leaves or needles. Dendropsia has been reported in elderly individuals experiencing \*visual hallucinations and \*illusions (as in \*Charles Bonnet syndrome, for example), in degenerative eye disease, and in \*hallucinogen-induced hallucinatory states. Pathophysiologically, dendropsia tends to be associated with central rather than peripheral mechanisms. The current ‘central’ model attributes the perception of branching forms to neuronal discharges affecting the retinocortical map (i.e. the patterns of connection between the retina and striate cortex), and/or neuronal circuits lying within striate cortex. Phenomenologically, dendropsia is distinguished somewhat arbitrarily from \*tesselopsia. Moreover, dendropsia should not be confused with the \*Purkinje effect, a physiological \*entoptic phenomenon consisting of irregular branching forms that can be observed by shining light onto the eyeball.

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## Denial of Blindness

see Anton–Babinski syndrome.

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## Depressive Disorder and Hallucinations

see Mood disorder and hallucinations.

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## Dermal Vision

see Eyeless vision.

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## Dermatozoic Hallucination

see Formicative hallucination.

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## Dermo-Optical Perception

see Eyeless vision.

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## Dermo-Optics

see Eyeless vision.

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## Descartes, René (1596–1650)

A French rationalist philosopher who – according to the British physician and alienist Forbes



**Fig. 2** René Descartes. Oil painting (1649) by Frans Hals. Source: Musée du Louvre, Paris

Benignus Winslow (1810–1874) – was plagued by the voice of an invisible person after a period of confinement. Reportedly, this voice urged Descartes “to pursue his search for truth”. The source of Winslow’s allegation is unknown, however, and although it has been repeated by eminent authors such as Edmund Parish (1861–1916), Cesare Lombroso (1836–1909), and Kurt Goldstein (1878–1965), experts on the life and work of Descartes question whether he actually experienced any \*verbal auditory hallucinations.

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## Desert Hallucination

A term used to denote a \*complex visual or \*panoramic hallucination reported by desert dwellers and travellers, which typically occurs during the night, and which may consist of scenes depicting caravans, rows of soldiers, trees, oases, etc. Desert hallucinations can also affect the \*auditory modality. Reportedly, they tend to have a high degree of \*xenopathy. They are attributed to the hardships of life in the desert, more specifically fatigue, undernourishment, thirst, and the monotonous character of sense impressions. Desert hallucinations may be related in a phenomenological and pathophysiological sense to \*hypnagogic and \*hypnopompic hallucinations. They should not be confused with the \*desert mirage, the \*fata morgana or other types of \*mirage.

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## Desert Mirage

see Highway mirage.

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## Deutan Colour Blindness

see the entries Deuteranopia and Daltonism.

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## Deutan Colour Deficiency

see the entries Deuteranopia and Daltonism.

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## Deutanomaly

Also known as deuteranomaly and anomalous trichromatic deuteranopia. All three terms are indebted to the Greek words *deuteros* (second), and *anōmalia* (anomaly, irregularity). They translate roughly as ‘an irregularity in the ability to perceive the second of the primary colours (i.e. green)’. The introduction of the term has been attributed to the German ophthalmologist and physiologist Willibald A. Nagel (1870–1911), the inventor of the Nagel anomaloscope (used in colour vision testing). Phenomenologically, deutanomaly presents in the form of a reduced sensitivity to greens. Pathophysologically it is associated with a diminished sensitivity of the retina’s green receptor mechanism. Deutanomaly is classified as an \*anomalous trichromatism, which itself constitutes one of the \*colour vision deficiencies. The term deutanomaly is used in opposition to \*protanomaly and \*tritanomaly.

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## Deuteranomaly

see Deutanomaly.

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## Deuteranopia

Also known as deutan colour deficiency, deutan colour blindness, \*Daltonism, and green-red blindness. The term deuteranopia comes from the Greek words *deuteros* (second), *an* (not) and *opsis* (seeing). It translates roughly to 'not being able to see the second of the primary colours, (i.e. green)'. The term deuteranopia was introduced in or shortly before 1837 by the German physicist August L.F.W. Seebeck (1805–1849) to denote the green-red type of \*colour vision deficiency. Deuteranopia can be divided into dichromatic deuteranopia and anomalous trichromatic deuteranopia. In dichromatic deuteranopia the green-red colour blindness is absolute, due to the absence of the medium-wavelength cones or M-cones. In anomalous trichromatic deuteranopia the M-cones are present, but malfunctioning. As a consequence, there is a diminished ability rather than an absolute inability to distinguish between greens and reds. The latter condition is also referred to as \*deutanomaly. Deuteranopia is the most common form of the colour vision deficiencies. As it is an X-linked autosomal condition, it affects 6% of all men, but very few women. The term deuteranopia is used in opposition to the terms \*protanopia and \*tritanopia.

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## Deuteroscopic Hallucination

The term deuteroscopic hallucination is indebted to the Greek words *deuteros* (second) and *skopeō* (I am looking at). In 19th-century medicine it was used as a synonym for \*autoscopy hallucination. The French physician and psychologist Paul Auguste Sollier (1861–1933) criticized the use of the term deuteroscopic hallucination, and introduced the term \*dissimilar autoscopy to replace it. Sollier motivated his proposal as follows: "The individual may see a figure who does not resemble his physical appearance, his sex, or his clothing, but with whom he identifies in a moral sense, and whom he acknowledges as being he himself. Such a form, which one may call dissimilar autoscopy, corresponds with what used to be called a deuteroscopic hallucination." Today dissimilar autoscopy is known as \*heautoscopy.

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## Deuteroscopia

The term deuteroscopia comes from the Greek words *deuteros* (second) and *skopeō* (I am looking at). The coiner of the term is unknown, but it was used for centuries in demonology and occultism before taking on a biomedical connotation. From 1837 onwards the German psychiatrist Friedrich Wilhelm Hagen (1814–1888) used the term deuteroscopia to denote a phenomenon that is now known as \*heautoscopy (i.e. the occurrence of a \*visual hallucination depicting an individual identified as oneself, even though it does not have the exact same physical characteristics). It was the French physician and mesmerist Charles Féré (1852–1907) who criticized the use of the term deuteroscopia, suggesting instead the term \*autoscopy (denoting the occurrence of a visual hallucination depicting one's self). The term deuteroscopia is now only used in occultism and parapsychology, where it serves as a synonym for second sight or \*clairvoyance, i.e.



the ability to evoke hallucinations or other perceptions considered to be veritable in nature.

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### Deutsch's Illusion

see Musical illusion.

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### Developmental Synaesthesia

A term introduced in or shortly before 1996 by the British neuroscientist Simon Baron-Cohen as a synonym for the term \*idiopathic synaesthesia.

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### Dichromatism

Also known as dichromatopsia, dyschromatopsia, and parachromatopsia. The term dichromatism comes from the Greek words *dis* (twice) and *chrōma* (colour). It refers to a type of \*colour vision deficiency in which one of the three colour receptor mechanisms is missing. Dichromatism is absolute, due to the absence of one type of retinal cone pigment. In trichromatic species such as humans there are three types of dichromatism, called \*protanopia, \*deutanopia, and \*tritanopia. The term dichromatism is used in opposition to the terms \*monochromatism and \*anomalous trichromatism.

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### Dichromatopsia

see Dichromatism.

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### Digital Sight

see Eyeless vision.

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### Dimensions of Visual Imagery

A term introduced during the early 1970s by the American psychopharmacologists Ronald K. Siegel and Murray E. Jarvik to denote a classification of the phenomenological characteristics of \*cannabis-induced visual imagery. More specifically, Siegel and Jarvik's classification constitutes an arrangement of regularly recurring forms that can be discerned among the numerous manifestations of cannabis-induced \*geometric hallucinations. This arrangement comprises (1) a form dimension (including the categories random, line, curve, web, lattice, tunnel, spiral, kaleidoscopic, and complex), (2) a colour dimension (including the categories black, violet, blue, green, yellow, orange, red, brown, and white), (3) a movement dimension (including the categories aimless, horizontal, oblique, explosive, concentric, rotational, and pulsating), and (4) a dimension of action patterns (including the categories complete image changes, changes within a single image, combining of images, repeating of images, and overlaying of images). Siegel and Jarvik's classification was patterned on that of mescaline-induced \*form-constants published in 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979). Both classifications may be seen as elaborations of the work of the 19th-century French physician Pierre Dheur on recurrent patterns of movement and disappearance in individuals experiencing \*visual hallucinations.

## References

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## Dimethyltryptamine (DMT) and Hallucinations

Dimethyltryptamine is also known as dimethyltryptamin, *N,N*-dimethyltryptamine, nigerin, nigerine, and nigerina. All six names are used more or less interchangeably to denote a hallucinogenic tryptamine belonging to the group of indole alkaloids. The substance DMT, or  $C_{12}H_{16}N_2$ , is a derivative of tryptamine with two additional methyl groups at the amine nitrogen atom. Its chemical structure is related to that of the \*hallucinogens psilocin and bufotenine, as well as to that of the neurotransmitter serotonin. Using the criterion of psychoactive potential as a guiding principle, DMT is usually classified as a \*deliriant. It is believed to act as a partial agonist of 5-hydroxytryptamine or serotonin receptors. However, it is not clear whether this is also the working mechanism behind its hallucinogenic effect. DMT was first synthesized in 1931 by the German-Canadian organic chemist Richard Helmuth Fred Manske (1901–1977). The Brazilian ethnobotanist and chemist Oswaldo Gonçalves de Lima was responsible for the name nigerine. DMT was first isolated from the seeds of *Anadenanthera peregrina* in 1955, and soon afterwards it became clear that it occurs naturally in many plants and animals, as well as in humans. DMT is usually ingested via smoking, but it can also be taken orally (along with a monoamine oxidase (MAO) inhibitor to prevent early breakdown), as well as intravenously, intranasally, and rectally. Its hallucinogenic effects have a short duration, i.e. on the order of 10 min when smoked or snuffed, and around 45 min when

injected. However, due to a \*time distortion known as \*protracted duration, the subjectively experienced duration of this time span tends to be much longer. The hallucinations evoked by the use of DMT are usually \*visual, \*compound or \*panoramic in nature, typically displaying human and humanoid beings (such as aliens, fairies, and elves). These hallucinatory states are described as having an extraordinarily alien quality sometimes referred to as 'hyperdimensionality'. According to the German anthropologist and ethnopharmacologist Christian Rátsch (b. 1957), DMT is "easily the most powerful psychedelic known". The function of DMT when it occurs naturally within the human nervous system is not fully understood. As Rátsch comments, "Neurobiologists are as yet uncertain about the role DMT might play in the nervous system. Hyperventilating causes the concentration of DMT in the lungs to increase. One physician has reported that the release of endogenous DMT is highest at the moment of death. It is my opinion that this chemical messenger is responsible for the ultimate shamanistic ecstasy, for enlightenment, and for the merging into the 'clear light of death'." A person intentionally employing DMT for the purpose of exploring the psyche may be called a \*psychonaut.

## References

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## Diminutive Visual Hallucination

see Microptic hallucination.

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## Dinitrogen Oxide and Hallucinations

see Nitrous oxide hallucination.

## Diplacusis

Also known as paracusis duplicata and double hearing. The term diplacusis comes from the Greek words *diploös* (double) and *akouein* (to hear). This translates to double sound or double hearing. The term is used as a generic term for a group of auditory distortions characterized by the hearing of a single tone at a different pitch in each ear. The American otolaryngologist George Elmer Shambaugh, Sr. (1869–1947) has been credited with providing the first case report of diplacusis in 1907, attributing the condition to slight differences in response on the part of the tectorial membranes of the right and left ear. In 1940 Shambaugh's son, George Elmer Shambaugh, Jr. (1903–2008) distinguished three varieties of diplacusis which he called diplacusis binauralis dysharmonica, diplacusis binauralis echotica, and diplacusis monauralis dysharmonica. Diplacusis binauralis dysharmonica, considered the most common variant of diplacusis, is conceptualized as an auditory distortion in which a single sound is heard at a different pitch by the two ears. The ensuing dissonant double clang is attributed to the disordered processing of sounds by a diseased ear, in combination with the normal processing of sounds by the other, healthy ear. In diplacusis binauralis echotica a single sound is heard a fraction of a second later by the diseased ear. In diplacusis monauralis dysharmonica a pure tone is heard as a double tone, due to echoing within the diseased ear itself. A fourth variant, known as diplacusis qualitatis, is conceptualized as a type of diplacusis in which the diseased ear is held responsible for changing the quality of notes without altering their pitch. Diplacusis is commonly classified as a type of \*paracusis (i.e. false acoustic perception). Etiologically, diplacusis is associated primarily with Ménière's disease and retrocochlear lesions. Beyond the context of pathology, however, cases of diplacusis on the order of 1 or 2% can be found in many individuals with normal hearing, especially under the influence of fatigue and/or exposure to noise.

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## Diplophaptia

see Synchiria.

## Diplopia

The term diplopia comes from the Greek words *diploös* (double) and *opsis* (seeing). It translates as double vision. The ensuing coexistence of similar images within the field of vision is called \*multiplication. Diplopia can be divided into two broad classes: binocular diplopia, in which both eyes are involved, and \*monocular diplopia in which only one eye is involved. When the term diplopia is used, it usually refers to binocular diplopia. For an account of monocular diplopia, see the entry Diplopia monocularis. Binocular diplopia is characterized by the visual perception of two identical images of a single object or stimulus, while looking with both eyes. The perceived image may display a horizontal, vertical, or oblique displacement, depending on the ocular muscles involved. Pathophysiologically, binocular diplopia is associated with a variety of conditions affecting the oculomotor nerve, the abducens nerve, the trochlear nerve, the eye muscles themselves, or the orbit (as in mass lesions). Etiologically, diplopia is associated with a variety of systemic conditions, including diabetes mellitus, hypertension, myasthenia gravis, herpes zoster, and aneurysm of the arteria communicans posterior. The local mechanical causes of diplopia binocularis include thyroid disease, orbit myositis, fracturing of the orbit wall, intraorbital tumour or haematoma, and Brown syndrome. Central causes of diplopia binocularis include mesencephalic lesions, pons lesions, increased intracranial pressure, and acute vitamin B1 defi-

ciency (i.e. Wernicke's syndrome). Diplopia may be transferred to the content of \*visual hallucinations, which then take the form of double images (also referred to as \*distorted hallucinations). The Scottish physicist David Brewster (1781–1868) is commonly credited with having been the first to demonstrate the mediation of distorted hallucinations experimentally. Whilst seeking to distinguish between sensory and hallucinatory visual images, he applied pressure to the eyeball of a test person, only to find that both types of percepts were doubled in the process. The term \*pseudodiplopia is sometimes used to denote cases of \*palinopsia, a condition which displays certain phenomenological similarities to diplopia.

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## Diplopia Monocularis

Also known as monocular diplopia and hallucinatory diplopia. The term diplopia monocularis is modern Latin for 'double vision with one eye'. The concomitant condition is characterized by the visual perception of two identical images based on a single object or stimulus, even when one eye is covered. The ensuing coexistence of identical images within the field of vision is called \*multiplication. The displacement of multiplied images can be in either a horizontal or vertical direction. Moreover, displacement can vary in accordance with the distance to the perceived object, and with the perceived object's orientation in the visual field (i.e. to the right or to the left). The ensuing images can differ in size, in distinctness (one being 'fuzzier' than the other), and in shape (displaying visual distortions, for example). Under physiological circumstances diplopia monocularis can be induced artificially with the aid of a double prism. Within the context of pathology, diplopia monocularis may occur as a consequence of a refractive/optical defect (including irregular astig-

matism, keratoconus, an early incipient cataract, a dislocated lens, and retinomacular disease), or as a result of the simultaneous employment of normal and abnormal retinal correspondences. Cortical causes of monocular diplopia include migraine and occipital lobe lesions. During the 19th century, diplopia monocularis also went by the name of diplopia monocularis hysterica. Due to its association with hysteria, as well as to medicine's failure to explain this phenomenon physiologically, it was long considered a purely functional symptom. The German neurologist Heinrich Lissauer (1861–1891) has been credited with introducing the notion that diplopia monocularis may stem from the eye's failure to accommodate properly. He agreed that the symptom was often associated with hysteria, but conjectured that individuals with hysteria might occasionally suffer from nerve disturbances affecting the lens system of the eye, thus causing the retina to receive a dual optical image instead of a single one. Diplopia monocularis may be classified as a visual distortion or \*metamorphopsia. When the condition is due to refractive/optical pathology, it can be classified alternatively as an \*entoptic phenomenon.

### References

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## Direct Voice

Also known as direct voice phenomenon. Both terms are used in parapsychology to denote an isolated voice, perceived by those participating in a spiritualist séance, as coming from a distinct location in extracorporeal space, and allegedly arising independently of the vocal organs of the medium present at such séances. In some cases of the direct voice phenomenon, it is claimed that the perceived sound is accompanied by a visually perceived device called a 'voice box' hovering above the floor, at the medium's shoulder or near the ceiling, purportedly made of a mysterious substance (sometimes designated as \*ectoplasm) by a spirit that is trying to make itself heard. In other versions there is either no ref-

erence to such a visible source of agency, or to a (physical) metal trumpet placed on the floor (hence the term ‘trumpet séance’ used sometimes to address this type of séance). In the latter case, it is claimed that the trumpet can be seen moving about the room autonomously, and that the direct voice is heard as emanating from the trumpet, wherever it positions itself. Reportedly, the direct voice can be preceded or accompanied by simple or geometric visual phenomena designated as ‘spirit lights’ or by \*faces in the dark. Biomedical explanations of the direct voice phenomenon include an illusionist trick called ‘near ventriloquism’, \*collective hallucinations, simple fraud, and \*subvocalization. The term subvocalization refers to a process involving subtle instances of motor activity within the larynx and/or vocal cords which may or may not be accompanied by \*verbal auditory hallucinations. Early experiments by the Scottish paranormal researcher John B. M’Indoe (also spelled as McIndoe), carried out with the aid of a sensitive telephone transmitter attached to the larynx of the medium, demonstrated that at least some cases of the direct voice phenomenon coincide with subvocalization. Within the context of the biomedical paradigm, the visual phenomena co-occurring with the direct voice phenomenon can perhaps best be explained as \*hypnagogic hallucinations.

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## Disjunctivism

The term disjunctivism is indebted to the Latin *dis* (apart, away from each other) and *ungere* (to connect). It translates loosely as ‘disconnection doctrine’. The term disjunctivism is used to denote a philosophical doctrine based on the disjunctive theory of appearances introduced in 1973 by the British philosopher John Michael Hinton

(1924–2000). Hinton’s theory denies that genuine sense perceptions and subjectively indistinguishable hallucinations are states of the same fundamental psychological kind. Starting from the premise that the two types of percepts are psychological experiences that may have identical qualities, the disjunctive theory suggests that they are nevertheless fundamentally different, due to the fact that the qualities of perceived objects or stimuli are *instantiated* in cases of genuine sense perception, whereas in cases of hallucinatory phenomena they are merely *represented*. In the words of the British philosopher Tim Crane “What the disjunctivist therefore rejects is what J.M. Hinton calls ‘the doctrine of the “experience” as the common element in a given perception’ and an indistinguishable hallucination. The most specific common description of both states, then, is a merely *disjunctive* one: the perceptual appearance of a rabbit is *either* a genuine perception of a rabbit *or* a mere hallucination of a rabbit. Hence the theory’s name.” A theory opposing disjunctivism is known under the name \*qualia theory.

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- Hinton, J.M. (1973). *Experiences: An inquiry into some ambiguities*. Oxford: Clarendon Press

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## Disorder of Corporeal Awareness

A term introduced in or shortly before 1963 by the British neurologist Macdonald Critchley (1900–1997) as an alternative for the term \*body schema illusion.

### Reference

- Critchley, M. (1965). *Disorders of corporeal awareness in parietal disease*. In: *The body percept*. Edited by Wapner, S., Werner, H. New York, NY: Random House.

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## Disorder of Perception

see Perceptual disturbance.

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### Disorder of Time Sense

see Time distortion.

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### Disposition

see Hallucinatory disposition.

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### Dissimilar Autoscapy

The term dissimilar autoscapy comes from the Latin words *dis* (not) and *similis* (alike), and from the Greek words *autos* (self) and *skopeō* (I am looking at). The French term *autoscopie dissemblable* (i.e. dissimilar autoscapy) was introduced in or shortly before 1903 by the French physician and psychologist Paul Auguste Sollier (1861–1933) to denote what is known today as \*heautoscapy, and formerly as \*deuteroscapy. All three terms refer to a \*visual hallucination depicting an image of oneself that deviates somewhat from a truthful mirror image. Sollier portrays the concomitant phenomenon as follows. “The individual may see a figure who does not resemble his physical appearance, his sex, or his clothing, but with whom he identifies in a moral sense, and whom he acknowledges as being he himself. Such a form, which one may call dissimilar autoscapy, corresponds with what used to be called a deuteroscopic hallucination.” Sollier classifies dissimilar autoscapy as a variant of \*positive autoscapy.

#### Reference

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### Dissociation and Hallucinations

The term dissociation comes from the Latin words *dis* (apart, away from each other) and *associare* (to gather, to unite). It was used as early as 1889 by the French philosopher and hypnotist Pierre Marie Félix Janet (1859–1947), and may have been introduced by him. The notion of dissociation is notorious for its wide-ranging meanings and connotations, but many definitions

revolve around the notion of an intrapsychic connection that is absent where it should be present, and the ensuing compartmentalization of mental functions. This compartmentalization involves a disconnection and subsequent isolation of mental functions – i.e. memory, personal identity, perception of the environment from the conscious I. In early accounts of dissociation, the ensuing isolation of mental functions used to be conceptualized as rather absolute. From the 1920s onwards, however, the notion of dissociation has also been allowed to apply to cases where a certain degree of interference or ‘leakage’ between the respective mental domains and the conscious I remains intact. It is generally held that the conceptual basis for the theory of dissociation stems from the work of the American physician Benjamin Rush (1745–1813), and from French pioneers such as Jacques-Joseph Moreau de Tours (1804–1884) and Jean Martin Charcot (1825–1893). In conformity with the work of the Swiss psychiatrist Carl Gustav Jung (1875–1961), dissociation tends to be explained in terms of a subconscious defense mechanism that either keeps conflicting strivings or impulses apart, or separates threatening ideas and feelings from conscious awareness. Conceptually as well as pathophysiologically, dissociation is associated primarily with states of altered consciousness such as \*ecstasy, \*trance, rapture, hypnotic states, \*twilight states, and somnambulism. During such states, elaborate hallucinations may either occur spontaneously, or be induced by a third party (such as a hypnotist). The ensuing hallucinations are referred to as \*dissociative hallucinations. A somewhat different use of the term dissociation can be found in the work of the German hallucinations researcher Edmund Parish (1861–1916). For an account of this usage, see the entry Dissociation model of hallucinatory experience.

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- Van der Hart, O., Horst, R. (1989). The dissociation theory of Pierre Janet. *Journal of Traumatic Stress*, 2, 397–412.

## Dissociation Model of Hallucinatory Experience

The term dissociation model is indebted to the Latin words *dis* (apart, away from each other) and *associare* (to gather, to unite). It refers to a hypothetical model introduced in or shortly before 1894 by the German hallucinations researcher Edmund Parish (1861–1916), which seeks to explain hallucinations in terms of perceptual input signals misdirected towards aberrant sensory cortical areas. The term dissociation is notorious for the wide range of meanings and connotations attached to it. The manner in which it is used in the context of the dissociation model of hallucinatory experience is based on the conventions of association psychology, which state that all mental activity is based on associations, and that regular paths of association can become disrupted or diverted under the influence of certain pathological conditions. When applied to the subject matter of hallucinatory experience, the dissociation model suggests that sensory input signals are sometimes diverted in the direction of aberrant loci within the sensory cortex, thus initiating perceptual processes that do not match with the input stimuli involved. Parish seeks to explain hallucinations by a virtually exclusive appeal to this type of dissociation. To account for all types of \*sensory deception, he divides dissociation into total and partial dissociation, with a further division of the latter subclass into systematic partial dissociation, localised partial dissociation, and diffused partial dissociation. In all of these cases, however, he attributes the mediation of hallucinations to a blocking of the regular course of sensory input signals by what he calls “a state of intracerebral tension”. This intracerebral tension is conceptualized by Parish in terms of psychological preoccupations that lend the concomitant brain area an ‘attractor’ function, thus causing the affected individual to hallucinate in accordance with his or her idiosyncratic, affect-laden themes. In Parish’s own words, “A false perception occurs when for some reason or other the cerebral elements are in such a state of tension that the incoming stimuli stream towards element-groups which normally would be discharged only by stimuli of another kind.” Modern variants of the dissociation model of hallucinatory experience are known under names such as \*biased competition, \*top-down atten-

tional factor, and cross-activation. The literature on \*bereavement hallucinations, for example, refers to biased competition as an important candidate mechanism for the perception of a deceased loved one (rather than some random image) by widowed individuals, whereas the literature on \*coloured hearing and other types of \*synaesthesia designates cross-activation between different sensory domains as one of its major explanatory models. Some important virtues of the dissociation model of hallucinatory experience are its close connection with the biomedical model of sense perception, and its capacity to link the specific contents of hallucinations to the realm of personal, qualitative experience. Thus it is well suited to explain the mediation of hallucinations charged with idiosyncratic and symbolic meaning, as is the case in many instances of \*reflex hallucination. Whether it is suited to explain all, or even a large number of hallucinatory experiences, is food for discussion.

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## Dissociative

The term dissociative comes from the Latin words *dis* (apart, away from each other) and *associare* (to gather, to unite). It translates loosely as ‘a substance capable of evoking a loosening of associations’. The term dissociative is used to denote a class of the \*hallucinogens characterized by the ability to reduce or block afferent signals to the conscious mind, especially those derivative of

the sense organs. Some examples of dissociatives are ketamine, dextromorphan, nitrous oxide, and muscimol (derived from the mushroom *Amanita muscaria*). Dissociatives are believed to act via the biochemical pathway of *N*-methyl *D*-aspartate (NMDA) receptor antagonism, and the inhibition of the action of glutamate within the CNS. It has been suggested that dissociatives evoke a pharmacologically induced state of \*sensory deprivation, and a subsequently increased awareness of endogenous activity in the service of self-exploration, dreamlike activity, and hallucinatory activity. The mode of action of the primary dissociatives is thought to be similar to that of \*phencyclidine (i.e. angel dust). The term dissociative is used in opposition to the terms \*psychedelic and \*deliriant, which refer to two additional classes of the group of hallucinogens. A person intentionally using a dissociative for the purpose of exploring the psyche may be called a \*psychonaut.

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### Dissociative Hallucination

The term dissociative hallucination is indebted to the Latin words *dis* (apart, away from each other) and *associare* (to gather, to unite). In its broadest sense, the term dissociative hallucination is considered more or less synonymous with terms such as \*pseudohallucination, \*quasi-hallucination, \*hysterical hallucination, and \*psychotic-like hallucination, which all refer to a perceptual phenomenon that for some reason or other does not fulfil all the formal criteria of a \*hallucination proper. In a more restricted sense, the term dissociative hallucination is used to denote a hallucination occurring in the context of \*dissociation. As used in the latter sense, dissociative hallucinations are traditionally deemed to occur during episodes of clouded or narrowed consciousness (i.e. during \*twilight states), to have a sudden and dramatic onset, and to be precipitated in many cases by an upsetting situation

or event. The alleged existence of a phenomenological distinction between dissociative hallucinations and \*hallucinations proper is increasingly losing credence. For a discussion of this issue, see the entry Borderline personality disorder (BPD) and hallucinations, as well as the entry Pseudohallucination.

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### Dissociative Twilight State

see Twilight state and hallucinations.

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### Distorted Hallucination

The term distorted hallucination is indebted to the Latin adjective *distortus*, which means twisted. It was used in 1894 by the German hallucinations researcher Edmund Parish (1861–1916) to denote a hallucination, typically visual in nature, which consists of an image with distorted or disfigured features. Parish explains the mediation of distorted hallucinations by reference to manipulation or illness of the peripheral sense organs, in combination with a central origin of the hallucinations at hand. Citing as examples sideways pressure to the eyeballs and strabismus due to atropin poisoning, he contends that “the distorted perception of objective impressions (resulting from failure of co-ordination in the eye-muscles) is transferred to the hallucination.” The technique of doubling visual hallucinations with the aid of gentle pressure to the eyeballs was developed by the Scottish physicist David Brewster (1781–1868). Whilst seeking to distinguish between sensory and hallucinatory visual images, Brewster applied pressure to the eyeball of a test person, only to find that both types of percepts were doubled in the process.

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## Distortion

see Distortion illusion.

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## Distortion Illusion

Also known as distortion. Both terms are indebted to the Latin adjective *distortus*, which means twisted. They are used to denote a type of \*visual illusion characterized by changes in the perceived size, length or curvature of a given object. Some well-known examples of distortion illusions are \*geometric-optical illusions such as the \*Café Wall illusion and the \*Müller-Lyer illusion. The term distortion illusion is used in opposition to the terms \*ambiguous illusion, \*paradox illusion, and \*fiction illusion.

### Reference

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## Distortions of Vital Sensations

see Vital sensations, distortions of.

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## ***Djinn* (also written as *jinn* or *jin*; plural: *djinns*, *jinns*, *jins*, *djnoun*, *jnoun*, *jenoun*, or *jnûn*)**

The term *djinn* is Arabic for spirit or ghost. It translates as ‘that which is veiled and cannot be seen’. The term ‘genius’, traditionally used in the Western literature, is incorrect as a translation of the term *djinn*. In accordance with Islamic religious teaching, *djnoun* are classified as ‘ghosts from beneath’, i.e. as living beings created by Allah out of smokeless fire. They are referred to as one of the four classes of humanoid beings, the other three being humans, angels, and Azazel or Iblees, who was later to become the chief of all *sheytâns* or devils (i.e. Satan). Out of these four classes, only human beings are normally considered to be visible to the eye. *Djnoun* are, how-

ever, deemed capable of making themselves visible if they so wish. They were allegedly created several thousand years before the human species and forced to inhabit islands far away from the continents, because they were found to be perverse and unwilling to reform. Like humans, they are believed to have a life cycle (they are born and die), to form families, communities, and societies, to eat, drink, move, procreate, urinate, defecate, and so on, and to be sensitive to offence. They reportedly carry out most of their activities at night. The presence of *djnoun* is regularly reported by North African and Turkish individuals with a clinical diagnosis of \*schizophrenia or \*affective disorder, but also by individuals with other clinical diagnoses. It may take some persuasion on behalf of the physician to get these individuals to talk about their *djnoun*, but when they do, they often provide detailed reports of creatures whispering in their ears, touching their shoulders, hitting them in the face or appearing in the form of snakes that climb up their legs or writhe around in their belly. Hallucinations in any of the sensory modalities can be attributed to a *djinn*, especially – although by no means exclusively – when they display human, humanoid, or animal characteristics. Common examples of unimodal hallucinations attributed to a *djinn* are \*verbal auditory hallucinations, \*haptic hallucinations, \*somatic hallucinations, \*sexual hallucinations, \*cacosmia, \*dysgeusia, and visual hallucinations depicting human beings or animals such as a cat, a dog, or a serpent (i.e. \*zoopsia). Multimodal or \*compound hallucinations – such as \*personifications – likewise occur. In the latter case, *djnoun* tend to be depicted as dark-coloured, foul-smelling creatures, who may touch or penetrate the body of the affected individual and may be heard speaking inside or outside one’s head. It is believed that *djnoun* exert their influence either from a place outside one’s body (by speaking, or producing foul odours, for example), through physical contact with one’s body (by touching or striking someone, or by sitting on their face or chest), or by entering the body. Some *djnoun* are believed to dwell in wet places such as a well, a stream, a toilet, or the kitchen sink and others in stones, ruins, cemeteries or garbage dumps. Allegedly, they can be aroused when a person passes by, steps upon them, or literally or figuratively ‘crosses a line’ (a phenomenon referred to as *tretat*). The person may simply have been ‘in the wrong place at the wrong time’, but he may also have committed an act considered sinful,

such as torturing or killing an animal, or pouring boiling water into the kitchen sink. A second way in which *djnoun* can be aroused is when a person in the possession of magic powers (referred to as *sHour* or *seHour*) casts a spell over someone. It is believed that this can be done in a multitude of ways, either with or without direct physical contact between the two individuals involved. *Djnoun* are sometimes classified according to gender (male or female), geographic origin (Arabic, Dutch, German, etc.), and religious background (Islamic, Christian, Jewish, etc.). It is said that in Western, biomedical terms, being possessed by a female, Jewish *djinn* is comparable to a clinical diagnosis of chronic, incurable schizophrenia. While *djnoun* may be a nuisance or a threat, they may also be of use, in the sense that they often give good advice or provide agreeable companionship. Islam makes a clear distinction between good and bad *djnoun*. In a psychiatric setting, however, they tend to terrorize their victims by insulting and threatening them, by luring them into dangerous behaviour, or by attacking them. *Djnoun* are often reported as saying that they will intensify their attacks upon their victim if the individual in question dares to speak of them in front of others. A traditional healer (referred to as a *fquih* or *feki*, which translates to 'religious scholar') may attempt to oust *djnoun* by means of Koranic readings, prayer, trance, animal sacrifice, amulets, or magical rituals such as fumigation with herbs (referred to as *b'khour* or *pkhor*). Beating the affected individual, or throwing him or her into a deep well – with the intent of frightening the *djinn* away – is also common practice. When traditional methods fail, the victims of *djnoun* are often handed over to Western doctors employing Western methods, who classify these apparitions as \*compound hallucinations, and treat them with antipsychotic and/or antidepressive medication. The Arabic names *Tufah al-jinn* (meaning apples of the djinn) and *Baydal-jinn* (testicles of the djinn) are used to denote the psychoactive plant mandrake or *Mandragora officinarum*.

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## D-Nightmare

see Nightmare.

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## Dodgson, Charles Lutwidge (1832–1898)

Better known as Lewis Carroll. A British mathematician, and member of the Society for Psychological Research (SPR), as well as an author of children's books, who is probably best known for his *Alice's Adventures in Wonderland*. As suggested in 1952 by the American neurologist Caro W. Lippman (1886–1954), Dodgson may have suffered from migraine with aura, and the writer's own experiences as a *migraineur* may have been a source of inspiration for some of Alice's



**Fig. 3** Charles Dodgson, a.k.a. Lewis Carroll

adventures. In this vein the British psychiatrist John Todd (1914–1987) introduced the term \*Alice in Wonderland syndrome in 1955 to denote a rare group of symptoms comprising subjective feelings such as \*hyperschematia, derealization, depersonalization, and somatopsychic duality, as well as perceptual symptoms such as illusory changes in the size, distance, or position of stationary objects within the subject's visual field (i.e. \*micropsia, \*macropsia, \*macroproxiopia, \*microtelesia, \*teleopsia, and \*plagiopsia), illusory feelings of levitation, and illusory alterations in the passage of time. In a paper published in 2002, the German psychiatrist Klaus Podoll and the curator of migraine art Derek Robinson (1928–2001) drew attention to the split body image of Sylvie in Dodgson's book *Sylvie and Bruno*, and speculated that Dodgson may have used a migraine-associated illusion of his own as a source of inspiration for this image as well. An alternative explanation for Dodgson's references to the above perceptual symptoms stems from the American historian and author Michael Carmichael. According to Carmichael, Dodgson had either read about the hallucinogenic effects of the mushroom *Amanita muscaria*, or experimented with the mushroom himself.

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### Donizetti, Domenico Gaetano Maria (1797–1848)

An Italian opera composer who suffered from neurosyphilis, and died in a state of \*psychosis or 'general paralysis'. On the basis of a care-

ful reconstruction of Donizetti's medical history, which includes recurrent fevers, severe headaches, convulsions, gastrointestinal problems, formal thought disorders, and delusions, it has been suggested that the composer's musical and lyrical creativity may have been influenced by his brain disease. In particular, the portrayal of the hallucinatory state of the historical Anne Boleyn (1501 or 1507–1536), second wife of King Henry VIII of England, which features prominently in Donizetti's opera *Anna Bolena*, has led historians to believe that Donizetti himself also suffered from hallucinations.

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### Donut Vision

see Bagel vision.

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### Dopamine Hypothesis of Hallucinatory Activity

Dopamine is also referred to as 3-hydroxytyramine,  $C_6H_3(OH)_2-CH_2-CH_2-NH_2$ , and 4-(2-aminoethyl)benzene-1,2-diol. The name dopamine is a contraction of the terms d(i)o(xy)p(henyl)a(lanine) and amine. The dopamine hypothesis constitutes a biochemical explanatory model for the mediation of hallucinations and other psychotic phenomena that attributes a central – although by no means exclusive – role to the action of dopamine within the CNS. Dopamine is classified chemically as a monoamine of the catecholamine family. It has a physiological function in both vertebrates and invertebrates, as a hormone, and as a neurotransmitter. In humans it is produced by various structures in the CNS, including the substantia nigra, and the ventral tegmental area. As a neurohormone, it is released by the hypothalamus. Dopamine was first synthesized in 1910 by the British chemists George Barger (1878–1939) and James Ewens. Its natural occurrence in the human CNS was demonstrated in 1957 by

the Swedish pharmacologists Arvid Carlsson (b. 1923) and Nils-Åke Hillarp (1916–1965). In 1974 the group headed by the American psychiatrist and pharmacologist Solomon H. Snyder (b. 1938) put forward the hypothesis that excess activity of dopamine may play a crucial role in the mediation of hallucinations and other psychotic phenomena. The group based their hypothesis on the discovery that chlorpromazine and other antipsychotic drugs of the phenothiazine class attach themselves to the postsynaptic dopamine receptor, and in this way appear to reduce the neurotransmitter's excitatory effect upon the mesolimbic pathways and other parts of the CNS. One of the virtues of Snyder's work was that it integrated many of the major historical discoveries in this area of research, including the conceptualization of chemical synaptic transmission by the German physiologist Emil du Bois-Reymond (1818–1896) in 1877, the empirical confirmation of the presence of neurotransmitters in the brain by the American biologist Betty Twarog in 1952, and the identification of dopamine as a neurotransmitter in the CNS by Carlsson et al. An additional, and in a sense complementary strand of research that paved the way for Snyder's work was the study of the effects of pro-dopaminergic substances such as cocaine and the amphetamines upon the CNS. Although the dopamine hypothesis still serves as an attractive explanatory model for the mediation of hallucinations and other psychotic phenomena, the initial hope of a one-on-one relationship between dopamine and psychosis was not confirmed. It is now generally held that other neurotransmitters (notably glutamate and serotonin) may play a role in the mediation of psychosis as well. Moreover, it has long been a mystery why the response rate of individuals with psychotic symptoms to any antipsychotic agent lies no higher than 50–60% on average, and why the blockade of dopamine D2 receptor-mediated transmission (which can be obtained within hours after the administration of antipsychotic agents) is usually followed by a significant reduction in psychotic symptoms after a period of only weeks to months. These empirical findings have prompted a shift in focus from 'fast' receptor blockade towards issues such as intracellular signalling, indirect effects, and neuroplasticity. However, arguably the most intriguing – and as yet unresolved – issue remains the exact influence of neurotransmitters such as dopamine upon perception.

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## Doppeldenken

The German term *Doppeldenken* translates literally to double thinking. It was used – and possibly also introduced – in 1889 by the German psychiatrist Emil Kraepelin (1856–1926) to denote \*audible thinking, or what the German psychiatrist August Cramer (1860–1912) had previously designated as \**Gedankenlautwerden*.

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## Doppelgänger

The German term *Doppelgänger* was introduced in 1796 in a collection of short stories colloquially known as *Siebenkäs*, published by the German writer Johann Paul Friedrich Richter, who was also known as Jean Paul (1763–1825). In the Anglo-Saxon literature the term *Doppelgänger* is either used untranslated (in the form of *doppelgänger*), or translated as \*double. In biomedicine both terms are used to denote a \*visual hallucination depicting a mirror image of oneself, such as may occur in cases of \*autoscopy, \*heautoscopy,



**Fig. 4** William Wilson and his *Doppelgänger*, by Harry Clarke. Source: Poe, E.A. (1928). *Tales of mystery and imagination*. Illustrated by Harry Clarke. London: George G. Harrap & Co

and other instances of \*reduplicative hallucination. The term *doppelgänger* is also used in the context of the \*syndrome of subjective doubles. The term \*somaesthetic *doppelgänger* is used as a synonym for the term \*sensed presence. In parapsychology a *doppelgänger* is an astral or etheric counterpart of the physical body, which is believed to be capable of temporarily moving about in extracorporeal space. The historical literature is replete with references to *doppelgängers* allegedly observed by the affected individual as well as by third parties. A well-known example is the story of St. Anthony of Padua (1195–1231), who reportedly preached simultaneously in two different places during the year 1226. Parapsychologists use the term *bilocitation* to refer to this phenomenon. To facilitate the study of the physiological correlates of *doppelgängers*, the Austrian psychiatrist Erich Menninger-Lerchenthal (d. 1966) proposed the term *eigenen Doppelgänger* (one's own *doppelgänger*) to denote doubles that are perceived by

the affected individual, but not by others. Neuroscientific studies of such *eigenen Doppelgänger* often hint at a biological correlate located in an area at the occipito-temporo-parietal junction.

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### Doppler Effect

Also known as Doppler shift. Both eponyms refer to the Austrian mathematician and physicist Christian Andreas Doppler (1803–1853), who first described the effect in or shortly before 1842. In perceptual neuroscience, they are used to denote an \*auditory illusion consisting of a change in frequency of a sound, as perceived by an observer moving relative to the source of the sound. In everyday life the Doppler effect is experienced when a motor vehicle approaches an observer, and then passes and recedes. As compared to the emitted frequency of the sound, the perceived frequency is increased during the approach, identical at the instant of passing by, and decreased during the recession. Doppler's original description had a bearing on the light waves emitted by binary stars. The application of his discovery to sound waves was published in 1845 by the Dutch chemist and meteorologist Christophorus Henricus Diedericus Buys Ballot (1817–1890).

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**Doppler Shift**

see Doppler effect.

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**Dostoevsky, Fjodor Michajlovitsj (1821–1881)**

A Russian author who during his adult life suffered from epileptic seizures. By his own estimate, these occurred every 3 weeks on average. As reconstructed by historians, they were probably due to temporal lobe pathology. In the context of these epileptic seizures Dostoevsky would seem to have experienced \*ecstatic auras and various other types of \*aurae. He wrote about the ecstatic aura which preceded what he considered to be his first epileptic seizure: “The air was filled with a big noise and I tried to move. I felt the heaven was going down upon the earth and that it engulfed me. I have really touched God. He came into me myself, yes God exists, I cried, and I don’t remember anything else. You all, healthy people... can’t imagine the happiness which we epileptics feel during the second before our fit. Mahomet, in his Koran, said he had seen Paradise and had gone into it. All these stupid clever men are quite sure he was a liar and a charlatan. But no, he did not lie, he really had been in Paradise during an attack of epilepsy; he was a victim of this disease like I was. I don’t know if this felicity lasts for seconds, hours or months, but believe me, for all the joys that life may bring, I would not exchange this one.” In addition, Dostoevsky experienced recurring \*verbal and \*nonverbal auditory hallucinations of largely unspecified content (the hallucinated sound of someone snoring is mentioned explicitly in the literature). Moreover, it has been spec-

ulated that the second Mr. Golyadkin featured in the novel *The Double* may have been inspired by an \*autoscopical hallucination experienced by Dostoevsky himself. Although historians of medicine tend to differ somewhat as regards their opinion on the exact debut, nature, and course of Dostoevsky’s illness (arguably the most extreme variant being the opinion, voiced by the Austrian founder of psychoanalysis Sigmund Freud (1856–1939), that Dostoevsky suffered from neurosis rather than epilepsy), they are unanimous in their view that it had a significant impact upon his literary creativity. The import of Dostoevsky’s work for hallucinations research lies in the combination of his first-hand acquaintance with hallucinatory phenomena, and his exceptional talent to verbalize and analyze these. This combination places him in a league with other hallucinating intellectuals, such as Victor Kandinsky (1849–1889), Daniel Paul Schreber (1842–1911), John Thomas Perceval (1803–1876), Christoph Friedrich Nicolai (1733–1811), Vaslav Nijinsky (1889–1950), Guy de Maupassant (1850–1893), and Ludwig Staudenmaier (1865–1933).

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**Double**

see Doppelgänger.

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**Double Consciousness**

Also referred to as dual consciousness, duplication of consciousness, doubling of awareness, double perceptions, and secondary personality. During the late 19th century these terms, and probably many more, were used to denote a condition in which two distinct mental states

coexist within a single individual. It is not clear who introduced the notion of double consciousness, but a German physician named Jensen is credited with being among the first to draw clinical attention to it. In 1868 Jensen used the German term *Doppelwahrnehmung* to denote what today is known as the *déjà vu* phenomenon. In the field of hallucinations research the term double consciousness is used to denote a mental state in which two streams of perceptual information – consisting, say, of \*scenic hallucinations on the one hand, and regular sense perceptions on the other – are experienced simultaneously. The Canadian neurosurgeon Wilder Graves Penfield (1891–1976) used the term to denote the mental state described by individuals experiencing \*reperceptive hallucinations due to cortical probing. As Penfield wrote, “Consider the point of view of the patient when the surgeon’s electrode, placed on the interpretive cortex, summons the replay of past experience. The stream of consciousness is suddenly doubled for him. He is aware of what is going on in the operating room as well as the ‘flashback’ from the past. He can discuss with the surgeon the meaning of both streams.” An analogous phenomenon was described by the Cypriot philosopher and psychologist Andreas Mavromatis in the context of his work on \*hypnagogic hallucinations. As Mavromatis points out, trained – and sometimes untrained – individuals can have “hypnagogic experiences in a state of double-consciousness in which [they] although deeply involved in their imaginal activities are still aware of their physical surroundings.” A third example of double consciousness is the mental state accompanying the \*lucid dream, characterized by the experience of the dream itself as well as the acute awareness that one is dreaming. When instances of \*out-of-body experience (OBE) and \*heautoscopy are experienced in rapid alternation, they are also referred to as double consciousness.

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### Double Dream

Also referred to as a ‘dream within a dream’. Both terms are used rather loosely to denote a \*dream during which a \*false awakening takes place.

#### Reference

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### Double Hearing

see Diplacusis.

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### Double Mirage

The term double mirage is indebted to the French verb *se mirer*, which means to reflect or to be reflected. It is used to denote a \*mirage or \*physical illusion consisting of a combined \*superior and \*inferior mirage. Inferior mirages are believed to result from light waves reflected upward, away from the surface of the earth, while superior mirages are believed to stem from light waves first bent upward, and then downward. The double mirage is a relatively rare \*optical illusion attributed to a combination of these two types of light reflection. The term double mirage is used in opposition to the terms inferior mirage, superior mirage, and \*lateral mirage.

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### Double Perceptions

see Double consciousness.

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### Double Rainbow

see Rainbow.

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### Doubling of Awareness

see Double consciousness.

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### Doughnut Vision

see Bagel vision.

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### Downward Sensory Impulse

see Reperception.

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## Dream

Also known as sleep dream, night dream, and nocturnal dream. All four terms are used interchangeably to denote an endogenously mediated perceptual experience occurring physiologically during sleep. Dreaming can be defined as the creation of percepts during sleep, in a format which the dreamer tends to experience as a participant rather than a mere observer. The dream's content tends to be primarily visual in nature (hence the term \*sleep dream vision), although the other sensory modalities may be involved as well. Near the end of the 19th century, dreams were divided into associative dreams and *Nervenreizträume* (i.e. 'nerve-impulse dreams'). Both terms were introduced in 1882 by the German philosopher Heinrich Spitta (1849–1929). Spitta uses the term associative dream to denote a dream that borrows its content in an associative manner from intrapsychic data such as wishes, fears, memories, and fantasies. Envisaging associative dreams as *de novo* perceptual experiences, Spitta conceptualizes these as analogous to hallucinations. The term *Nervenreiztraum* is used by him

to denote the type of dream prompted by external perceptual stimuli (such as the sound of the rain or a door closing, or the feeling of a cat jumping onto the bed). Therefore, Spitta likens *Nervenreizträume* to \*illusions. Dreams are associated primarily, although not exclusively, with periods of rapid eye movement (i.e. the REM state of paradoxical sleep). Their mediation is associated primarily with neurophysiological activity in the pons. The term \*lucid dream is used to denote a dream during which the individual is aware that he or she is dreaming while the dream is in progress. Traditionally dreams are distinguished from \*hallucinations proper by their occurrence during sleep, as well as by their capacity to replace the whole sensory environment. Except for \*panoramic or \*scenic hallucinations, hallucinations tend to coincide (and often to blend in) with regular sense perceptions. However, the \*continuum hypothesis put forward by the French classical scholar and dream researcher Louis-Ferdinand-Alfred Maury (1817–1892) suggests that dreams and hallucinations are not distinct but continuous phenomena. Moreover, it has been suggested by a small minority of authors that dreams should be granted the status of hallucinations. For example, the American psychiatrist and sleep researcher William Charles Dement (b. 1928) asserts that "there can be little question that dreams qualify as hallucinations." The term night dream is used in opposition to the term \*daydream. The global cessation of dreaming following bilateral occipital infarction is known as the \*Charcot-Wilbrand syndrome.

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## Dream Anxiety Attack

see Nightmare.

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## Dream Pain

see Hypnalgia.

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## Dream Fish

Also known as nightmare fish. Both terms are used to denote a group of ichthyallyeinotoxic fishes such as *Kyphosus fuscus*, *Kyphosus vaigiensis*, *Sarpa salpa*, *Siganus spinus*, and *Mulloidichthys samoensis*, many of which are indigenous to the Indian and Pacific Oceans, and/or the Mediterranean Sea. Eating the heads or other body parts of these fish may lead to hallucinogenic fish poisoning or \*ichthyallyeinotoxism, a rare condition characterized by the occurrence of vivid \*visual and \*auditory hallucinations, \*nightmares, and sometimes frank \*delirium. Reportedly, *S. salpa* was used in the past for ceremonial purposes in Polynesia, and for recreational purposes in countries surrounding the Mediterranean Sea during the era of the Roman Empire. The toxin or toxins responsible for the mediation of ichthyallyeinotoxism are unknown. As all ichthyallyeinotoxic fishes are algal grazers, it has been suggested that they derive their hallucinogenic properties from alkaloids of the indole group, which display similarities in chemical structure to LSD, and which occur naturally in certain types of algae and phytoplankton. It has also been suggested that ichthyallyeinotoxism is mediated by the presence in the fish of \*dimethyltryptamine (DMT), a \*hallucinogen even more potent than the indoles.

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## Dream Intrusion

see Perceptual release theory of hallucinations.

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## Dream Scintillation

Also known as flickering consciousness. The term dream scintillation is indebted to the Latin noun *scintilla* (spark). It was introduced in or shortly before 1949 by the American neurobiologist Alexander Forbes (1882–1965) to denote a brief, dream-like flash of what seems to be a dream memory occurring to the waking, unclouded mind. In Forbes's original self-report, episodes of dream scintillations sometimes lasted for hours. They consisted of chaotic, kaleidoscopic sequences of \*visual hallucinations reminiscent of the type of dream image that one may experience while falling asleep. They came at a rapid-fire sequence, and were accompanied, in Forbes's case, by disorientation in time, as well as a subjective sense of estrangement. Four out of five of these episodes were preceded by strong emotional stimuli plus strenuous physical exertion. According to the American psychiatrists Mardi Jon Horowitz (b. 1934) et al., dream scintillations are phenomenologically different from \*hypnagogic hallucinations and dreams, in that they display a non-linear, flickering quality, and defy any attempt at psychoanalytic interpretation. In conformity with the opinion voiced by the Canadian neurosurgeon Wilder Graves Penfield (1891–1976), Horowitz et al. argue that "the phenomenon bears sufficient resemblance to occurrences in persons with temporal-lobe seizures that it might be considered a minor variant or forme fruste of temporal-lobe epilepsy triggered by metabolic fatigue or local circulatory factors." They propose the term 'flickering consciousness' as an alternative to Forbes's expression 'dream scintillation'. Conceptually as well as phenomenologically, dream scintillations would seem to be related to auras occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy, notably \*visual aura, \*psychic aura, and \*persistent aura without infarction.

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 29, 284–292.

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### Dream Screen

Also known as matrix of the mind and background object of primary identification. The term dream screen was introduced in or shortly before 1946 by the American psychoanalyst Bertram David Lewin (1896–1971) to denote the hypothetical background upon which a \*dream appears to be projected. As Lewin explains, “The dream screen, as I define it, is the surface on which a dream appears to be projected. It is the blank background, present in the dream though not necessarily seen, and the visually perceived action of ordinary manifest dream contents takes place on it or before it. Theoretically it may be part of the latent or the manifest content, but this distinction is academic. The dream screen is not often noted or mentioned by the analytic patient, and in the practical business of dream interpretation, the analyst is not concerned with it.” Phenomenologically, the dream screen may be related to the virtual ‘screen’ upon which \*visual hallucinations sometimes appear to be ‘projected’. In the literature this phenomenon has been reported in various types of visual hallucination, notably those occurring in the context of substance abuse.

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### Dreaming True

see Lucid dream.

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### Dreamy Mental State

see Dreamy state.

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### Dreamy State

Also referred to as dreamy mental state and intellectual aura. The term dreamy state was introduced in or shortly before 1879 by the British neurologist John Hughlings Jackson (1835–1911), as a somewhat paradoxical replacement for the term intellectual aura, introduced by him in 1876. Over the years, both notions came to designate a brief state of over-consciousness (i.e. a heightened intellectual state) occurring either in isolation or during the onset of an epileptic seizure. Phenomenologically, this state of over-consciousness is characterized by simple or complex experiential phenomena. Simple phenomena occurring in the context of the dreamy state are conceptualized by Jackson as a false sense of reminiscence, i.e. what today is commonly referred to as \**déjà vu*. The complex dreamy states, also referred to as voluminous mental states, are considered to be more diverse in character. For Jackson they included the feeling that one is losing touch with the world or that one is somewhere else (i.e. derealization), as well as a loss of personal identity, deprivation of corporeal substance (i.e. depersonalization), \*ecstatic states, states of profound despair, and a state called \*double consciousness. The relation between these states on the one hand, and epileptic seizures on the other was summarized by the British neurologist James Crichton-Browne (1840–1938): “The dreamy mental state of one kind or another is not rarely the introduction to an epileptic fit and in that case is designated as an intellectual *aura* or warning.” Pathophysiologically, Jackson attributed the dreamy state to a \*release phenomenon preceding an actual epileptic seizure affecting the midtemporal region. In 1899 he reported on various additional phenomena occurring at the onset of epileptic seizures, associating these with what he then called the group of uncinat fits or uncinat epilepsies (of which the dreamy state constitutes only one group of clinical varieties). However, both Jackson and Crichton-Browne believed that not all dreamy states should necessarily be attributed to epileptic activity. Today the dreamy state tends to be classified as a partial epileptic seizure or \*aura. As such, it may be complicated by associated symptoms such as \*gustatory hallucinations, \*olfactory hallucinations, \*auditory hallucinations, unusual epigastric sensations (i.e. \*abdominal aura), and

motor \*automatisms (notably repetitive motions of sniffing, smelling, or smacking of the lips). Although Jackson's name is inextricably connected with the notion of the dreamy state, the clinical phenomenon itself had previously been described by authors such as the French psychiatrists Théodore Herpin (1799–1865), and Jean Pierre Falret (1794–1870).

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## Drug

see Psychoactive substance.

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## Drug-Induced Hallucination

Also known as psychedelic hallucination. Both terms are used to denote a hallucination occurring after the use of a \*psychoactive substance. The British anthropologist Richard Rudgley (b. 1961) defines psychoactive substances as “those that alter the state of consciousness of the user. These effects may range from the mild stimulation caused by a single cup of tea or coffee to the powerful mind-altering effects induced by hallucinogens such as LSD or certain mushrooms, in which profound changes may occur in the perception of time, space and self.” Although many substances registered as therapeutics are also capable of producing hallucinations, the terms drug-induced hallucination and psychedelic hallucination tend to be used in the context of substances not intended primarily for therapeutic purposes. The number of known psychoactive substances is vast, and it is very likely that they constitute a mere fraction of the psychoactive substances naturally available and synthetically produceable. They are referred to

by a wide variety of generic terms, including \*hallucinogen, hallucinogenic drug, hallucinogenic substance, magicum, pseudohallucinogen, illusinogen, mysticomimetic, \*psychedelic, psychedelic drug, psychedelic substance, psychotic, \*psychotomimetic, \*phantasticum, \*eideticum, \*deliriant, and \*dissociative.

### References

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- Rudgley, R. (1998). *The encyclopaedia of psychoactive substances*. London: Little, Brown and Company.

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## Drug-Induced Synaesthesia

A term used to denote a type of \*synaesthesia (i.e. a member of the group of perceptual phenomena exemplified by \*colour hearing) falling into the class of \*non-idiopathic synaesthesias. Etiologically, drug-induced synaesthesias are associated primarily with the use of \*psychotomimetic substances such as LSD, mescaline, and peyote.

### Reference

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## Dual Consciousness

see Double consciousness.

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## Dual-input Model of Hallucinations

A term used to denote a hypothetical model for the mediation of hallucinations that was formulated during the 1960s by the American psychiatrist Louis Jolyon West (1924–1999). Basically, the dual-input model would seem to constitute a variant of the older \*perceptual release model. In 1962 West used the metaphor of a man standing at a closed glass window opposite a fireplace,

looking out of the window into the garden while the Sun is setting, watching the garden becoming gradually darker, and the reflection of the fireplace becoming gradually brighter. In West's own words, "In perceptual release, the daylight (sensory input) is reduced while the interior illumination (general level of arousal) remains bright, and images originating within the rooms of our brains may be perceived as though they came from outside the window of our senses. The theory thus holds that a sustained level and variety of sensory input normally is required to inhibit the emergence of percepts or memory traces from within the brain itself." Like the \*experiential projector model of hallucinations, the dual-input model emphasizes the role of arousal in the release of endogenous percepts. As West maintains, "The greater the level of arousal, the more vivid the hallucinations."

#### Reference

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### Dual System Experience

A term introduced in or shortly before 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to denote a visual experience that may arise in mescaline intoxication, involving the radical difference between two groups of phenomena. As Klüver wrote, "The hues, shapes, designs and movements, etc. in one group seem radically different from those of the other group. Thus the observer has the feeling of viewing two 'systems' or even two 'antagonistic' systems as he may refer to them, e.g. as 'solar' or 'polar' systems. Frantic motion may be typical of one system while slow majestic movements are characteristic of the other one. In psychotic states these two systems the differences of which are merely differences in visual properties may gain 'cosmic significance'."

#### Reference

Klüver, H. (1966). *Mescal and Mechanisms of hallucinations*. Chicago, IL: University of Chicago Press.

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### Duck-Rabbit

see Jastrow's duck-rabbit.

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### Dumbbell Phosphene

Also known as dumbbell-shaped phosphene. Both terms are used to denote a type of \*phosphene (i.e. 'seeing stars') that may arise after sustained convergence of the eyes, especially with closed eyes against an illuminated background. The name dumbbell phosphene refers to the typical dumbbell shape of these phenomena, extending horizontally from the region of the fovea to the periphery. Dumbbell phosphenes are classified as a variant of the \*convergence phosphene, which is in turn classified as an \*entoptic phenomenon or a \*physiological illusion. The term dumbbell phosphene is used in opposition to the term \*fiery rings of Purkinje.

#### Reference

Tyler, C.W. (1978). Some new entoptic phenomena. *Vision Research*, 18, 1633–1639.

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### Duplication of Consciousness

see Double consciousness.

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### Dysacusis

see Hyperacusis.

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### Dysaesthesia

The term dysaesthesia comes from the Greek words *dus* (bad) and *aisthanesthai* (to notice, to perceive). It translates loosely as 'bad feeling'. The term dysaesthesia is used as a generic term for a number of unpleasant tactile and somatic percepts such as tingling (i.e. \*paraesthesia), burning, numbness, a feeling of pins and needles, coldness, wetness (i.e. a hygic sensation or \*hygic hallucination), pain (i.e. \*hyperalgesia, \*allodynia), and the perceived absence of body parts (i.e. \*acnesthesia or asomatognosia). Some

types of dysaesthesia are associated with peripheral conditions such as small fibre neuropathies, neuromata, and nerve traumata, whereas others are associated with parietal lobe pathology, due, for example, to multiple sclerosis or to \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy.

#### Reference

Critchley, M. (1953). *The parietal lobes*. London: Edward Arnold & Co.

### Dysauris

see Hyperacusis.

### Dyschromatopsia

The term dyschromatopsia comes from the Greek words *dus* (bad), *chrōmatos* (coloured), and *opsis* (seeing). It tends to be used as a synonym for the term \*dichromatism. Although not a true synonym for \*colour blindness and \*colour-vision deficiency, it is sometimes used as more or less interchangeably with these terms. In addition, the term dyschromatopsia has been used as a synonym for the term colour confusion, and as a term denoting an incomplete variant of \*achromatopsia (i.e. the inability or strongly diminished ability to perceive colour).

#### Reference

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### Dyschronation

see Time distortion.

### Dysgeusia

The term dysgeusia comes from the Greek adjective *dus* (bad) and the Latin noun *gustum* (taste). It refers to an alteration or distortion of the sense of taste in response to normal chemoreceptor stimulation, as in eating or drinking. It typically presents in the form of an excessively

sweet, bitter, salty or metallic taste, referred to as sweet dysgeusia, bitter dysgeusia, salt dysgeusia, and metallic dysgeusia, respectively. Dysgeusia is often associated with – and may be confused with – \*parosmia. It may also be confused with \*parageusia, which refers to a foul or spoiled taste rather than a mere alteration or distortion of the sense of taste. Etiologically, dysgeusia is associated primarily with diseases of the upper respiratory tract, viral influenza, general anaesthesia, iatrogenic damage of the chorda tympani, the use of illicit substances such as alcohol, opium, and amphetamines, and the use of therapeutics. The list of therapeutics associated with dysgeusia includes captopril, acetazolamide, allopurinol, lithium, metronidazole, flurazepam, and at least 70 other substances. In some cases dysgeusia may be attributable to central disorders of the gustatory tract. Dysgeusia is classified as a \*gustatory illusion (i.e. a taste illusion) or a \*chemosensory disorder.

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### Dysmegalopsia

The term dysmegalopsia comes from the Greek words *dus* (bad), *meegas* (big), and *opsis* (seeing). It translates roughly as the diminished ability to appreciate the size of objects. Dysmegalopsia is generally classified as a \*sensory distortion or, more specifically, as a variant of \*metamorphopsia. Dysmegalopsia may present either as an isolated symptom (i.e. as \*macropsia or \*micropsia), or as part of a cluster of symptoms called the \*Alice in Wonderland syndrome. In or shortly before 1916, the British neurologist Samuel Alexander Kinnier Wilson (1878–1937) proposed the new term \*dysmetropsia as a replacement for dysmegalopsia.

#### Reference

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## Dysmetropsia

The term dysmetropsia comes from the Greek words *dus* (bad), *metron* (yardstick), and *opsis* (seeing). It is used to denote a distorted perception of image size. The term dysmetropsia was introduced in or shortly before 1916 by the British neurologist Samuel Alexander Kinnier Wilson (1878–1937) to replace the older term \*dysmegalopsia. Wilson defines dysmetropsia as a defect in the visual appreciation of the measure or size of objects, whether by over-estimation or by under-estimation. On phenomenological grounds, dysmetropsia is commonly divided into four categories, comprising \*macropsia, \*micropsia, \*pelopsia, and \*teleopsia. However, combinations and intermediate forms (such as \*porropsia, \*microtelepsia, and \*macroproxiopia) have been described as well. Using the alleged locus of origin as a guiding principle, Wilson divides dysmetropsia into a peripheral and a central form, and the latter into a cortical and a transcortical (or psychical) form. As noted by Wilson, dysmetropsia may occur physiologically (i.e. in the case of objects appearing larger through a fog, and in the case of the \*Moon illusion), but also in the context of disease (notably tabes dorsalis, syphilitic basal meningitis, epilepsy, hysteria, tic disorder, alcoholism, and retinal conditions such as retinitis, and sarcoma of the choroid). Dysmetropsia is generally classified as a \*sensory distortion, more specifically, as a variant of \*metamorphopsia. However, in some hierarchical models it constitutes a class of its own, ranking at the same level as the metamorphopsias. Wilson himself motivates this arrangement by pointing out that metamorphopsias are characterized by a *distortion* of the visual image, whereas dysmetropsia involves a *change in estimated size*, without any kind of distortion of the interrelationships between the image's constituent parts.

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## Dysmorphopsia

The term dysmorphopsia comes from the Greek words *dus* (bad), *morphè* (form), and *opsis* (seeing). It translates roughly as the inability to perceive the proper form of objects. In a restricted sense, the term dysmorphopsia is used to denote a variant of \*metamorphopsia in which lines appear wavy. In this version, dysmorphopsia is associated primarily with bilateral occipital cortical damage, due to carbon monoxide poisoning, for example, or to the use of psychotomimetic substances such as cocaine, LSD, or mescaline. As exemplified by the work of the German psychiatrist Carl Schneider (1891–1945), the term dysmorphopsia used to have a broader connotation during the first decades of the 20th century, denoting something like the present umbrella term metamorphopsia. Conversely, the term metamorphopsia is used by the Danish neuroscientists Villars Lunn, Axel Klee (1933–1982?), and Rolf Willanger to denote a visual distortion in which objects appear to have distorted contours (i.e. what is now called dysmorphopsia).

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## Dysosmia

see Parosmia.

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## Dysplaptopsia

The term dysplaptopsia comes from the Greek words *dus* (bad), *platus* (flat), and *opsis* (seeing).

It is used to denote a visual distortion in which objects are perceived as flattened and elongated. Dysplaptopsia is associated primarily with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy, and with the use of \*hallucinogenic substances such as LSD and mescaline. It is commonly classified as a \*metamorphopsia, which is itself classified as a \*sensory distortion.

**Reference**

Wieser, H.G. (2000). *Temporal lobe epilepsies*. In: *Handbook of clinical neurology. Volume 73. The epilepsies. Part II*. Edited by Vinken, P.J., Bruyn, G.W. Amsterdam: Verlag Hans Huber.

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# E

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## Earthquake

A term introduced in or shortly before 1951 by the American neurologist Caro W. Lippman (1886–1954) to denote a shaking sensation or shock movement which suggests that the bed – or the entire room – is shaking violently. This \*kinaesthetic hallucination tends to occur during the period of relaxation prior to sleep onset, to last for half a minute or more, and to fade away gradually. Because of its association with migraine, the earthquake may be considered an \*aural phenomenon. Lippman himself classifies it as a \*space-motion hallucination.

### Reference

Lippman, C.W. (1951). Hallucinations in migraine. *American Journal of Psychiatry*, 107, 856–858.

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## Écho de la pensée

The French term *écho de la pensée* translates into English as audible thinking, thought-echo, thought echoing, or thoughts-out-loud, and into German as \**Gedankenlautwerden*. The introduction of the term *écho de la pensée* has been attributed to the French psychiatrist Gaëtan Georges Gatian de Clérambault (1852–1934). However, as noted by the French psychiatrist Charles Durand, prior to de Clérambault the term was used as early as 1892 by the French psy-

chiatrist Louis Jules Ernest Séglas (1856–1939), while even the latter may not have been its inventor.

### References

Durand, Ch. (1941). *L'Écho de la pensée*. Paris: G. Doin & Cie.  
Séglas, J. (1892). *Des troubles du langage chez les aliénés*. Paris: J. Rueff et Cie.

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## Echo of Reading

Also known as reading echo, and repetition of reading. All three terms refer to a variant of \**Gedankenlautwerden* in which the reading of words or sentences is accompanied by an audible echo of those same words or sentences. Echo of reading is usually classified as a type of \*verbal auditory hallucination (VAH). Although the phenomenon features in many of the classic textbooks of psychiatry, it would seem that the first empirical study of the subject did not appear until 1933. In that year the Swiss psychiatrist Ferdinand Morel (1888–1957) published a study which suggests that the perceived 'echo' either precedes or accompanies the conscious visual perception of words and sentences, and that written words that cannot not be pronounced by the test person tend to be omitted from the perceived 'echo'. Morel also notes that many individuals familiar with this symptom are able to suppress it by holding their breath, immobilizing their lips, or reading out loud. Because

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the phenomenon may be accompanied by subtle laryngeal movements (i.e. \*subvocalization), Morel proposes that echo of reading be assigned to the class of \*muscular verbal hallucinations. Echo of reading would seem to be a relatively rare phenomenon, especially in comparison with other types of \*verbal hallucinations. In a selected sample of 125 individuals familiar with a psychotic disorder (diagnosed during the 1960s with either dementia praecox or 'paranoid condition'), the American psychiatrist Marjorie C. Meehan found 37 cases of echo of reading. Only two of these cases involved echo of reading in an isolated form, while the remaining 35 were cases in which other types of \*auditory hallucinations were also experienced. In five out of Meehan's 37 subjects *Gedankenlautwerden* was also present.

### References

- Meehan, M.C. (1963). Echo of reading: Impersonal projection in schizophrenia. *Psychiatric Quarterly*, 16, 156–166.
- Morel, F. (1933). l'Écho de la lecture. Contribution à l'étude des hallucinations auditives verbales. *l'Encéphale*, 28, 169–183.

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## Ecsomatic Experience

see Out-of-body experience (OBE or OBEE).

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## Ecstasy with Looking Back at Oneself

see Out-of-body experience (OBE or OBEE).

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## Ecstasy, Mysticism, and Hallucinations

The term ecstasy comes from the Greek noun *ekstasis*, which has a variety of meanings and connotations, including departure, dismissal, mental derangement, and poignancy. In the present context it translates loosely as 'being outside oneself'. Ecstasy can be designated as a mental and physical condition associated with the apprehension that that which is perceived is the ultimate reality. When and by whom the term ecstasy was introduced is unknown, but

it has been in use for a very long time, and has had different connotations for representatives of various mystical, religious, philosophical, anthropological, psychological, and biomedical traditions. The British classical scholar, writer, poet, and paranormal researcher Frederic Myers (1843–1901) aptly captures the classical mystical connotation of ecstasy when he portrays the condition as "a wandering vision which is not confined to this world or this material world alone, but introduces the seer into the spiritual world and among communities higher than any which this planet knows." An early attempt to differentiate between the metaphysical and scientific connotations of ecstasy can be found in the work of the French alienist Alexandre Jacques François Briere de Boismont (1797–1881), who uses the term ecstasy to denote a state of over-excitement of the nervous system expressing itself in the form of a habitual elevation of ideas and feelings, brought about by concentration on a single subject. As Briere de Boismont asserts, "This condition of the mind is also the most favourable to the existence of hallucinations, and hence they are very common in the ecstatic." Briere de Boismont designates some types of ecstasy as physiological, and others as pathological in nature. As he maintains, "It is . . . important to distinguish between what we shall term *physiological* ecstasy and *morbid* ecstasy. In other words, we consider that ecstasy may have no influence over the reason, and may only consist in enthusiasm carried to the highest degree, while, on the other hand, it may give rise to extravagant, reprehensible, and unreasonable acts . . . This division enables us to arrange in one class prophets, saints, philosophers, and many celebrated persons whose ecstasies have resulted from profound meditation, from a sudden enlightenment of their thoughts, or from a supernatural intuition; while in the other class may be ranged the pythoness of antiquity, the celebrated sects of the Middle Ages, the nuns of Loudun, the Convulsionists, the Illuminati, and many other religious enthusiasts." To Briere de Boismont, ecstasy is associated on the one hand with \*mysticism, and on the other with conditions such as catalepsy, hysteria, somnambulism, and animal magnetism. In present-day biomedicine and psychology the term ecstasy has a chiefly emotional connotation, referring to a mental state characterized by intense pleasure and elation, such as may occur during hypomanic or manic episodes, mystical states, drug-induced

euphoric states, orgasmic states, and extreme aesthetic experiences. In this reading, ecstasy may be accompanied by a \*trance-like state characterized by an altered consciousness, slowness of breathing, bradycardia, catatonic symptoms, \*total anaesthesia, and hallucinations. Ecstatic states tend to have a gradual onset, but they may also be paroxysmal in nature. In the latter case, the term rapture is used. Conceptually as well as phenomenologically, ecstasy is considered to be related to other states of altered consciousness, including \*trance, \*dissociation, hypnotic states, and somnambulism. Hallucinations occurring in the context of ecstasy tend to be \*visual or \*auditory in nature, but they may occur in any of the sensory modalities or be \*compound and/or \*panoramic in nature. Today many cases of ecstasy are associated in an etiological sense with \*psychic auras occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy, or in the context of catatonia, dissociation, the use of \*entheogens (i.e. \*hallucinogenic substances), and the final stages of dying (i.e. \*deathbed visions). As to their neurobiological correlates, ecstatic states are associated primarily with aberrant neuronal discharges in the temporal or temporo-parietal lobe. It has also been suggested that both ecstasy and 'the clear light of death' experienced in \*deathbed visions may be associated with the massive release of the neurotransmitter dimethyltryptamine (DMT). Today a person intentionally employing ecstatic states for the purpose of exploring the psyche may be called a \*psychonaut. When occurring in the context of an epileptic or migrainous \*aura, ecstatic states are referred to as \*ecstatic auras. In the parapsychological literature the expression 'ecstasy with looking back at oneself' is used as a synonym for \*out-of-body experience.

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- Myers, F.W.H. (1903). *Human personality and its survival of bodily death. Volume II*. London: Longmans, Green, and Co.

## Ecstatic Aura

The term ecstatic aura comes from the Greek words *ekstasis* (departure, dismissal, mental derangement, poignancy, 'being outside oneself'), and *aura* (breeze, smell). It is used to denote a type of \*aura (i.e. a 'warning symptom') preceding a paroxysmal neurological disorder such as migraine or epilepsy during which \*protracted time or other \*time distortions may occur, and the affected individual may experience a feeling of blissful unity with God or with the All. The Russian author Fjodor Michajlovitsj Dostoevsky (1821–1881), who experienced ecstatic auras preceding his frequent epileptic seizures, wrote that "during a few moments I feel such happiness that it is impossible to realize at other times, and other people cannot imagine it. I feel a complete harmony within myself and in the world, and this feeling is so strong and so sweet that for a few seconds of this enjoyment one would readily exchange ten years of one's life - perhaps even one's whole life." Elsewhere Dostoevsky says that, "Probably it was of such an instant that the epileptic Mahomet was speaking when he said that he had visited all the dwelling places of Allah within a shorter time than it took for his pitcher full of water to empty itself." Etiologically and pathophysiologically, ecstatic auras are associated primarily with temporal lobe epilepsy. It has been claimed by the American-Canadian neuropsychologist Michael A. Persinger (b. 1945) that ecstatic auras can be evoked experimentally with the aid of a \*Koren helmet, i.e. a device which applies complex, computer-generated magnetic pulses to the temporo-parietal region. It has also been suggested that the results of Persinger's group might indicate that ecstatic and religious experiences in general may have a neural basis, associated with aberrant neurophysiological activity in the temporal and/or parietal lobes. Religious experiences occurring in the context of an ecstatic aura are referred to as \*ictal religious experiences. The notion of ecstatic aura is closely related to the notion of \*psychic aura.

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## Ectoplasm

Also known as ectoplasmic substance. The term ectoplasm comes from the Greek words *ektos* (exterior, from the outside) and *plasma* (something formed or moulded). It was introduced in or shortly before 1894 by the French physiologist and Nobel Prize laureate Charles Robert Richet (1850–1935) to denote a hypothetical substance analogous to protoplasm, allegedly exuding from the bodily orifices of some physical mediums during séances, and reportedly being both visible and palpable to individuals without any claimed paranormal abilities who were present at such séances. Reports of ectoplasmic substances *avant la lettre* date back at least to the work of the British philosopher and alchemist



**Fig. 1** Ectoplasm. Photograph by Fritz Grunewald. Source: Dessoir, M., ed. (1925). *Der Okkultismus in Urkunden. Der physikalische Mediumismus*. Berlin: Verlag Ullstein

Thomas Vaughan (1622–1666). The substances in question are variously described as vapours or cloud-like condensations emanating from a medium's body, as white luminous spots, as phosphorescent columns, or – most commonly – as an amorphous gelatinous mass. This mass is described as black, grey, luminescent or – mostly – white, and capable of transforming into anthropomorphous shapes such as faces or phantom hands called 'pseudopods'. When ectoplasmic substances are moulded in the likeness of one's self, the term ideoplasm is used. When they are produced at a distance the terms psychoplasm and teleplasm apply. In parapsychology ectoplasm is traditionally designated as a materialization phenomenon. Although Richet himself was convinced of the existence of the ectoplasmic substance, and claimed to have attended hundreds of sittings where mediums produced it, he admitted that he could explain neither its origin nor its genesis. Three possibilities suggested by him – albeit reluctantly – involved the substance's creation by the spirits of deceased individuals, the intervention of metaphysical beings such as spirits, daimones, and angels upon matter, and the production of the substance by the medium's body itself. Richet, as well as Frederic Myers (1843–1901), Baron Albert von Schrenck-Notzing (1862–1929), and other prominent paranormal researchers during the Interbellum were well aware that a substantial number of mediums involved in the production of ectoplasmic phenomena were frauds. Still, in reply to those who would dismiss ectoplasmic phenomena *per se* as absurd, Richet used to hold that they are indeed absurd, but nevertheless true. As he wrote, "I shall not waste time in stating the absurdities, almost the impossibilities, from a psychophysiological point of view, of this phenomenon. A living being, or living matter, formed under our eyes, which has its proper warmth, apparently a circulation of blood, and a physiological respiration (as I proved by causing the form of Bien Boa to breathe into a flask containing baryta water), which has also a kind of psychic personality having a will distinct from the will of the medium, in a word, a new human being! This is surely the climax of marvels! Nevertheless it is a fact." Biomedical explanations of ectoplasm, other than those referring to stage magic, do not exist. After World War II the number of reports on these phenomena rapidly declined, and today even many paranormal researchers tend to doubt whether genuine cases ever existed.

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## Ectoplasmic Substance

see Ectoplasm.

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## Eidetic Image

Also referred to as eidetic imagery, eidetic phenomenon, mental imagery, imagery, and photographic memory. The adjective eidetic comes from the Greek noun *eidos*, which means appearance or idea. The term eidetic image was introduced in or shortly before 1909 by the German philosopher and psychologist Erich Jaensch (1883–1940) to denote an unusually vivid visual representation of an object or stimulus in the external world that is no longer within eyesight. In so-called eidetic individuals, such images can be evoked through simple visual inspection of a physical object or stimulus. When the object or stimulus is removed, the individual retains a detailed memory image that may or may not appear to be projected into external physical space. Historically various classificatory arrangements of eidetic images have been proposed. When the quality of the image resembled that of a regular visual percept, it was formerly referred to as an eidetic phenomenon of the tetanoid or T-type, after the purported relation with calcium metabolism and tetany. When it resembled a memory image rather than a regular visual percept, it was referred to as an eidetic phenomenon of the Basedowoid or B-type, after the alleged relation with thyroid function. Various mixed types have been proposed as well, including BT (Basedowoid–Tetanoid), TB (Tetanoid–Basedowoid), TE (Tetanoid–Epileptoid), and BH (Basedowoid–Hysterical). Other historical clas-

sificatory arrangements are governed by psychoanalytic principles, personality characteristics, etc. Eidetic images have also been termed \*voluntary hallucinations. They are generally distinguished from \*hallucinations proper by their specific connection with objects in the external world, their ego-syntonic character, and sometimes by other phenomenological characteristics. Jaensch also distinguishes them from \*afterimages, memory images, and products of the imagination. However, others have suggested that eidetic imagery may be related conceptually, phenomenologically, and perhaps (patho-) physiologically to other mnemonic events, such as \*memory-afterimages, \*flashbacks occurring in the context of post-traumatic stress disorder (PTSD), drug-related \*flashbacks, \*hallucinogen-induced persistent perception disorder (HPPD), \*palinopsia, \*phantom pain, \*reperceptive hallucinations, and \*flashbulb memories. Conceptually, eidetic images are regarded either as discrete phenomena or as phenomena that lie on a continuum which includes regular memory images and/or afterimages. An extreme variant of the latter conceptual current is advocated by the American psychologist Gordon Allport (1897–1967), who tends to downplay the differences between eidetic images and lively memory images. Eidetic imagery is reputed to occur in 2–15% of children between the ages of 7 and 14. Jaensch claims that no less than 50% of all children of elementary school age are capable of forming eidetic images. However, in 1964 the American psychologists Ralph Norman Haber and Ruth Haber tested 179 school children, and found that no more than 8% of them were capable of calling up eidetic images. It is generally agreed that the ability to form eidetic images tends to diminish with age, and eventually disappears. In adults, it is a rare talent that hardly manifests itself spontaneously. There are exceptions, however, such as 'S', the man described by the Russian neuropsychologist Aleksandr Romanovitch Luria (1902–1977) in *The Mind of a Mnemonist*. Eidetic imagery, especially in children, has been studied at least since 1819, as witness a publication by the Bohemian physiologist Johannes Evangelista Purkyně (1787–1869). Various other important studies were carried out around the turn of the century by the British scientist Sir Francis Galton (1822–1911), by the French psychologist Alfred Binet (1857–1911), and by Jaensch. Before Jaensch introduced the term eidetic imagery, the phenomenon was referred to in

German as *Anschaubild*, and in English as imagery or mental imagery. The scientific interest in eidetic imagery declined significantly with the advent of behaviourism. Today the phenomenon enjoys something of a cult status among individuals who call themselves *eidetikers*, and who exchange scientific as well as personal views via the popular press and the internet.

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of chemical substances which in relatively high doses have the potential to alter consciousness, and to evoke phenomena such as hallucinations, \*illusions, \*sensory distortions, \*delirium, loss of contact with reality, and occasionally coma and death. In 1979 the term \*entheogen was proposed as an alternative for these terms, in an effort to reinstate the original spiritual connotations of substances like these within \*mysticism and shamanism. For a more detailed account of this group of substances, see the entry Hallucinogen.

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## Eidetic Imagery

see Eidetic image.

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## Eidetic Phenomenon

see Eidetic image.

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## Eideticum

Also known as \*hallucinogen, hallucinogenic drug, hallucinogenic substance, magicum, phanerothyme, pseudohallucinogen, illusinogen, mysticomimetic, \*psychedelic, psychedelic drug, psychedelic substance, psychotic, \*psychotomimetic, and \*phantasticum. The term eideticum comes from the Greek noun *eidōs*, which means appearance or idea. The Greek-German neologism *Eidetikum* was introduced in or shortly before 1941 by the German psychologist Willy Hugo Hellpach (1877–1955), a former student of Emil Kraepelin (1856–1926). The term eideticum and its equivalents are used more or less interchangeably to denote a group

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## Eidolia

see Hallucinotic eidolia.

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## Eigengrau

Also known as *Eigenlicht*, light-dust, light chaos, dark light, brain light, and idioretinal light. The term *Eigengrau* comes from the German *eigen* (one's own), and *grau* (gray), and translates loosely as 'intrinsic gray'. The term was introduced in or shortly before 1860 by the German psychologist Gustav Theodor Fechner (1801–1887) to denote the disorganized motion of greyish colour seen in perfect darkness. It has traditionally been assumed that *Eigengrau* is mediated by action potentials sent along the optic nerve, whether or not derivative of \*visual noise produced by the retina. However, empirical findings suggest that the thermal isomerization of the retinal pigment molecule rhodopsin may be responsible for producing this visual noise. An alternative hypothesis suggests that *Eigengrau* is mediated by the spontaneous release of neurotransmitters within the visual pathways and/or striate cortex. It has been argued that *Eigengrau* is the substratum out of which visual \*hypnagogic hallucinations and sleep dream visions arise. *Eigengrau* is either classified as a \*retinogenic

phenomenon, a \*closed-eye hallucination, or a type of visual noise.

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### Eigenlicht

see *Eigengrau*.

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### Electrocortical Stimulation

see Cortical probing and hallucinations.

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### Electromagnetic Field Disturbances and Hallucinations

see Solar wind and hallucinations.

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### Electronic Voice Phenomenon (EVP)

Also known as Raudive voices, after the Latvian-Swedish psychologist and parapsychologist Konstantin Raudive (1900–1974). Both terms are used in parapsychology to denote an intelligible and meaningful message that can be discerned in static noise on the radio, or in any other type of white noise. In parapsychology messages such as these can be attributed to a metaphysical source such as a ghost, a spirit, or an extraterrestrial life form. In biomedicine the EVP is considered a \*cognitive illusion of the \*auditory pareidolia type, caused by a process called \*apophenia (i.e. an excess of perceptual or heuristic sensitivity leading to the discernment of patterns or connections in random or otherwise meaningless data). As a phenomenon, the EVP was discovered in 1959 by the Swedish-Russian painter and musician Friedrich Jürgenson (1903–1987) while

recording the singing of wild birds. Reportedly, Jürgenson discerned the sound of a trumpet in the vibrating noises interrupting his recordings, followed by a male voice speaking in Norwegian. He speculated that the voice might stem from a dead individual, and after having heard his mother's voice on a subsequent tape he developed a research programme in the context of which he conducted thousands of experiments with tape recorders, focusing more and more on static noise from the radio. His favourite radio frequency at 1,485.0 kHz is now known as the Jürgenson Frequency. Raudive, who had visited Jürgenson in 1965, significantly expanded this line of research. The research initiated by the two authors was carried on by numerous EVP enthusiasts.

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- Raudive, K. (1971). *Breakthrough*. New York, NY: Taplinger Publishing Company.

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### Elementary Hallucination

see Simple hallucination.

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### Emminghaus's Definition of Hallucinations

In 1878 the German psychiatrist Hermann Emminghaus (1845–1904) defined hallucinations as follows. “*Hallucinations* are understood as phantasms that do not result from external impressions.”

### Reference

- Emminghaus, H. (1878). *Allgemeine Psychopathologie, zur Einführung in das Studium der Geistesstörungen*. Leipzig: F.C.W. Vogel.



Fig. 2 Hermann Emminghaus

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### Endomorphins and Hallucinations

see Opioid-induced hallucination.

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### Endorphins and Hallucinations

see Opioid-induced hallucination.

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### Enhanced Stereoscopic Vision

The term enhanced stereoscopic vision is used to denote a type of \*metamorphopsia (i.e. a visual distortion) whereby near objects seem to be closer than they are, and more distant objects appear to be further away than they are. As a result, the subjective sensation of the depth and detail of visually perceived objects is exaggerated. The term enhanced stereoscopic vision is used in opposition to the term \*loss of stereoscopic vision.

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### Entheogen

The term entheogen comes from the Greek words *en* (within), *theos* (god), and *generare* (to generate, to bring forth). It translates as ‘becoming divine within’. The term entheogen refers to a \*hallucinogen or other psychoactive substance believed to occasion a spiritual or \*mystical experience, similar to those in traditional shamanic rituals. The term entheogen was introduced in or shortly before 1979 by the American classical scholars Carl Anton Paul Ruck (b. 1935) et al. as an alternative for terms such as \*hallucinogen, \*phantasticum, \*eideticum, psychotic, and \*psychedelic. The reason for coining this neologism was the authors’ dissatisfaction with the usual connotations of the latter terms, especially in contradistinction to the shaman’s striving for “transcendent and beatific states of communion with deity”. As Ruck et al. state, it would be “incongruous to speak of a shaman’s taking a ‘psychedelic’ drug.” Some examples of traditional entheogens are *ayahuasca*, cannabis, ibogaine, kava, opium, psilocybin mushrooms, peyote, salvia, and tobacco. Today a person intentionally employing an entheogen for the purpose of exploring the psyche may be called a \*psychonaut.

### Reference

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### Entity

A term used in parapsychology to denote a human or humanoid figure that features in a \*veridical hallucination. In this context the real person depicted in the hallucination is called the apparent, and the experience as a whole an entity experience. Entities can present in the form of friends, relatives, strangers, public figures, living or dead people, angels, demons, other visitors from a different plane of being, etc.

**Reference**

Evans, H. (1984). *Visions, apparitions, alien visitors. A comparative study of the entity enigma*. Wellingborough: The Aquarian Press.

**Entomopia**

Also known as insect vision. The term entomopia comes from the Greek words *entomos* (insect) and *ops* (eye). It was coined in or shortly before 1993 by the American neurologists Jaime R. Lopez, Bruce T. Adornato, and William F. Hoyt to denote rows and columns of multiple visual images, assembled of multiple reduplications of a single object or stimulus. The resulting coexistence of similar images within the field of vision is called \*multiplication. Entomopia is classified by Lopez et al. as a type of \*polyopia. Polyopia is generally classified as a type of \*palinopsia, which in turn constitutes a type of \*metamorphopsia. In the case described by Lopez et al., the affected individual perceived 100–200 reduplicated images at a time, obscuring his entire field of vision, and making it difficult for him to remain standing. Such episodes of entomopia lasted no longer than 2 min. The etiology and pathophysiology of entomopia are not fully understood. Central variants of polyopia are associated etiologically with a variety of conditions affecting the occipital or occipito-parietal lobe, including encephalitis, trauma, migraine, and the use of \*hallucinogens such as mescaline or LSD. It is not inconceivable that similar conditions may be involved in the mediation of entomopia.

**Reference**

Lopez, J.R., Adornato, B.T., Hoyt, W.F. (1993). 'Entomopia': A remarkable case of cerebral polyopia. *Neurology*, 43, 2145–2146.

**Entophthalmic Phenomenon**

The term entophthalmic phenomenon is indebted to the Greek words *entos* (inside) and *ophthalmos* (eye). It was proposed in 1978 by the American neuroscientist Christopher W. Tyler as a substitute for the term \*entoptic phenomenon. For a further explanation of the term's intended use, see the entry Entoptic phenomenon.

**Reference**

Tyler, C.W. (1978). Some new entoptic phenomena. *Vision Research*, 18, 1633–1639.

**Entopsia**

see Muscae volitantes.

**Entoptic Form**

see Entoptic phenomenon.

**Entoptic Hallucination**

The term entoptic hallucination is indebted to the Greek words *entos* (inside) and *opsis* (seeing). It is used to denote a \*visual hallucination that is attributed primarily to intraocular pathology. The term entoptic hallucination is sometimes used as a synonym for the term \*entoptic phenomenon, although strictly speaking not all entoptic phenomena – such as \*xanthopsia and \*erythroptopsia – belong to the class hallucinations. Because of its emphasis on the involvement of a specific CNS structure (i.e. the eye) the entoptic hallucination model can be classified as a \*topological model of hallucinatory activity.

**Reference**

Priestly, B.S., Foree, K. (1955). Clinical significance of some entoptic phenomena. *Archives of Ophthalmology*, 53, 390–397.

**Entoptic Image**

see Entoptic phenomenon.

**Entoptic Imagery**

see Entoptic phenomenon.



## Entoptic Phenomenon

Also known as entoptic imagery, entoptic image, and entoptic form. All four terms are indebted to the Greek words *entos* (inside) and *opsis* (seeing). Traditionally the expression entoptic phenomenon is used to denote any member of a group of visual percepts attributed to physiological or pathological changes within the eye. Most entoptic phenomena are \*simple in nature. Some examples are the \*blue-field entoptic phenomenon, the \*macular star pattern, \*xanthopsia, \*muscae volitantes, some types of \*metamorphopsia, some types of \*afterimage, and some of the phenomena designated as \*phosphenes. Sometimes the term \*entoptic hallucination is used to denote these phenomena, in spite of the fact that strictly speaking not all entoptic phenomena are hallucinations. As entoptic phenomena and hallucinations are not mutually exclusive categories, the use of these terms has proved to be a source of some conceptual confusion. An additional source of confusion, pertaining to the exact meaning and connotations of the term entoptic phenomenon, was pointed out by the American neuroscientist Christopher W. Tyler. According to Tyler, the term entoptic phenomenon should be reserved for a visual sensation whose characteristics derive from the structure of the visual system as a whole, not merely from the structure of the eyeball. Therefore, he suggests that the term entoptic phenomenon be replaced by \*entophthalmic phenomenon, and that the term entoptic phenomenon be used for a broader class of visual percepts that are attributable to the visual system as a whole. Probably because the latter category is traditionally referred to as \*visual hallucination, Tyler's proposal found little support. Up to the present, the term entoptic phenomenon is generally used to denote a visual percept attributed primarily to intraocular processes, while illusory or hallucinated percepts attributed to a process affecting the retina are referred to as idioretinal phenomena, idioretinal sensations, and \*retinogenic phenomena. For visual percepts deriving from objects or stimuli projected onto the surface of the cornea, the term \*pseudentoptic phenomenon is preferred.

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Tyler, C.W. (1978). Some new entoptic phenomena. *Vision Research*, 18, 1633–1639.

## Environmental Tilt

Also referred to as visual tilting, tilting illusion, upside-down reversal of seeing, and floor-on-ceiling phenomenon. All five terms denote a transient illusory percept in which the extracorporeal environment assumes a tilted or upside-down position. Environmental tilt typically lasts for several seconds, and usually no longer than an hour. The tilting tends to take place through a variable arc between 90° and 180°, sometimes slowly, but mostly paroxysmally. The perceived spatial relationships within the environment remain intact. The phenomenon tends to be accompanied by dizziness. Environmental tilt usually presents as a binocular illusory phenomenon, but monocular cases have been reported as well. The return to a normal orientation of the perceived objects tends to be abrupt. Restoration of normal orientation may be followed by an episode of \*diplopia. In 1983 the expression \*tortopia was suggested by the American neurologist Allan H. Ropper to denote the symptom complex of tilting of the visual environment. Pathophysiologically, environmental tilt is attributed primarily to functional disturbances affecting connections between cerebellar and cerebral vestibular–otolithic pathways. Less frequently, it is attributed to pontomedullary or cerebral cortical (especially parieto-occipital) dysfunction. Etiologically, environmental tilt is associated with a variety of neurological conditions, including the lateral medullary syndrome of Wallenberg, labyrinthine disorders, transient ischaemic attacks (TIAs) affecting the vertebrobasilar artery territory, multiple sclerosis, trauma, and encephalitis. After lateral medullary infarction, environmental tilt may last up to several days. In a conceptual and phenomenological sense, environmental tilt is closely related to \*plagiopsia.

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## Ephedrine and Hallucinations

The name ephedrine comes from the Greek noun *ephedra*, which means pony tail. It refers to an amphetamine-like alkaloid of the phenylethylamine group that was isolated from the plant ma-huang (i.e. *Ephedra vulgaris*) in 1885 by the Japanese organic chemist and pharmacologist Nagai Nagayoshi (1844–1929). In 1893, Nagayoshi synthesized \*methamphetamine from ephedrine. In 1929, he also synthesized ephedrine itself, and elucidated its structural formula. Ephedrine, as well as the related substances norephedrine and pseudoephedrine, occur naturally in many species of the *Ephedraceae* family, a group of plants indigenous to Eurasia and the Americas. These species have been used since ancient times for ritual and medicinal purposes, as an aphrodisiac, and perhaps also as a stimulant in combat and hunting. The effects of ephedra are considered to be mildly euphoriant and stimulating. However, ephedra can be – and has been – used as an additive in hallucinogenic concoctions. A person intentionally employing ephedrine for the purpose of exploring the psyche may be called a \*psychonaut.

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## Ephialtes

Also known as Ephialtis. Both names stem from the Greek noun *ephialtēs* (also spelled as *epi-*



**Fig. 3** Titans and giants (Ephialtes and three other giants). Woodcut by Gustave Doré

*altēs*), which means leaper, or ‘the one who jumps upon’. In Greek mythology Ephialtes, a manifestation of Pan, was considered the daimon of \*nightmares. In 1900 the German classical scholar Wilhelm Heinrich Roscher (1845–1923) published an extensive account of the essence of the classical and modern nightmare in relation to Ephialtes. Referring to the nightmare-inducing experiments carried out by one of his contemporaries, Roscher asserts that “In these cases the nightmare was a peculiar bastard animal – half dog and half monkey – that did not, as before, slowly slink up to the bed, but sprang in one leap upon the breast of the victim without being previously noticed (as the result of covering the patient’s face). This sudden leaping jump of the nightmare is characteristic of the majority of cases and hence the word ‘Ephialtes’ – ‘the one who jumps up’ – is very apt. The animal then remained quiet as if sleeping on his victim while the unfortunate person, out of sheer anxiety, did not dare to move until finally the animal fell down as the result of some movement executed at the height of the torture.” According to Roscher, shapes in which the nightmare tends to appear are the cat, marten, hedgehog, mouse, bear, he-goat, pig, horse, tiger, snake, toad, eel, dragon, and half-dog-half-monkey. Human or humanoid figures, such as a goblin, a satyr, or a giant, are also considered possible manifestations. However, in Roscher’s opinion the most frequent embodiment of the nightmare is the black poodle. Representatives of the Hippocratic School strongly opposed the popular view that the nightmare was a god, or demi-god, or wicked spirit. Instead, they

considered the nightmare the equivalent of epilepsy, which they carefully addressed as ‘the disease called sacred’, suggesting its status as a natural rather than a supernatural disease. The term \*ephialtes nocturnus is used in the older literature as a synonym for \*nightmare, and \*ephialtes vigilantium as a synonym for \*daymare.

#### Reference

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### Ephialtes Nocturnus

The term ephialtes nocturnus comes from the Greek noun *ephialtēs* (leaper, ‘the one who jumps upon’) and the Latin adjective *nocturnus* (nightly). It is used in the older literature as a synonym for \*nightmare. The term ephialtes nocturnus is used in opposition to \*ephialtes vigilantium (i.e. \*daymare).

#### Reference

Good, J.M. (1823). *The study of medicine. In four volumes*. Boston, MA: Wells and Lilly.

### Ephialtes Vigilantium

The term ephialtes vigilantium comes from the Greek noun *ephialtēs* (leaper, ‘the one who jumps upon’) and the Latin adjective *vigilans* (waking, awake). It translates loosely as ‘a nightmare of those awake’. It is used in the older literature as a synonym for \*daymare. The term ephialtes vigilantium is used in opposition to \*ephialtes nocturnus (i.e. \*nightmare).

#### Reference

Good, J.M. (1823). *The study of medicine. In four volumes*. Boston, MA: Wells and Lilly.

### Ephialtis

see Ephialtes.

### Epidemic Chorea

see Dancing mania and hallucinations.

### Epidemic Hallucination

Also known as popular hallucination and mass hallucinosis. All three terms are used to denote a hallucination shared by a relatively large number of people, who typically believe the content of the hallucination in question to be \*veridical or at least \*coincidental in nature. The French alienist Alexandre Jacques François Briere de Boismont (1797–1881) gives the following examples, derived from the work of the French chronicler and physician Rigord (c. 1150–c. 1209): “On the day Saladin entered the Holy City, says Rigord, the monks of Argenteuil saw the moon descend from heaven upon earth, and then reascend to heaven. In many churches the crucifixes and images of the saints shed tears of blood in the presence of the faithful... These examples, which we have selected from many others related by the same writer, clearly prove that hallucinations may affect a number of persons at the same time, without there being any reason to accuse them of insanity.” In biomedicine the mediation of epidemic hallucinations is associated primarily with phenomena such as mass hysteria and mass hypnosis. Paranormal and religious explanations for the working mechanism of epidemic hallucinations typically range from telepathy to divine intervention. The German hallucinations researcher Edmund Parish (1861–1916) distinguishes the epidemic hallucination from the \*collective hallucination, reserving the latter term for a type of hallucination in which a limited number of people are under the impression that they share a common hallucinatory percept.

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Briere de Boismont, A. (1859). *On hallucinations. A history and explanation of apparitions, visions, dreams, ecstasy, magnetism, and somnambulism*. Translated by Hulme, R.T. London: Henry Renshaw.

Critchley, M. (1939). Visual and auditory hallucinations. *British Medical Journal*, 2, 634–639.

Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

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## Epidemic of Dancing

see Dancing mania and hallucinations.

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## Epigastric Aura

see Abdominal aura.

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## Epilepsy and Hallucinations

The term epilepsy comes from the Greek verb *epilambanein* (to attack). It refers to a neurological disorder characterized by recurrent seizures. The introduction of the term epilepsy is generally attributed to the Persian physician and philosopher Abu Ali Al-Hoessein Ibn Abdoellah Ibn Sina, better known as Avicenna (980–1037). Among the more or less synonymous historic names are falling evil, great evil, Herculean disease, hieron nosema, morbus caducus, morbus lunaticus, morbus major soticus, nosema

paideon, sacred disease, and ‘the disease called sacred’. The latter expression stems from the Hippocratic Corpus, where it was used to express the authors’ suspicion of a natural rather than a metaphysical affliction. Nevertheless, epilepsy retained its metaphysical connotations until the 18th century and beyond. Today the seizures characteristic of epilepsy are attributed to abnormal, excessive, and/or synchronous neuronal discharges in the brain. Over the years, the International League Against Epilepsy (ILAE) has issued several classifications of epilepsy, designed to facilitate clinical diagnosis and empirical research. The members of this classification constitute epileptic syndromes, i.e. hypothetical nosological constructs involving neurological diseases that can be held responsible for the mediation of certain types of seizure. The ILAE has also issued several classifications of epileptic seizures. An arrangement of epileptic seizures according to the sensory spheres or modalities in which they may manifest themselves yields the following classification: motor seizures (affecting the motor sphere), dialeptic seizures (affecting the consciousness sphere), special seizures (affecting the autonomic sphere), and \*aurae (affecting the sensory sphere). Hallucinations, \*illusions, and \*sensory distortions occurring prior to an epileptic seizure tend to be relegated to the



**Fig. 4** Avicenna. Source: Avicenna (1595). *Avicennae Arabum Medicorum Principis. Canon Medicinae*. Venetiis: Apud Iuntas

aura category. However, these perceptual phenomena also occur during the aftermath of a seizure. In the international literature, both types of epilepsy-related hallucinatory phenomena are also referred to as experiential phenomenon, experiential hallucinosis, experiential response, \*ictal hallucination, \*epileptic hallucination, and \*hallucinatory epilepsy. A third category of hallucinatory phenomena attributed to epilepsy are those occurring in the context of a \*twilight state. A relation between epilepsy and hallucinations has been suspected for at least 2,000 years. In 1889 the British neurologists John Hughlings Jackson (1835–1911) and Charles Beevor (1854–1908) were the first to describe an \*olfactory aura occurring in the context of an epileptic seizure, with a demonstrable tumour in the patient's right temporal lobe. Jackson went on to study auras, developing his nosological models of the \*dreamy state and uncinat epilepsy. Since the time of Jackson and Beevor, auras have been described for each of the sensory modalities. When occurring exclusively in the context of epilepsy, such auras are referred to as aura epileptica. These phenomena typically last for several seconds, sometimes minutes. With the aid of cortical probing experiments it has been demonstrated that auras can also be evoked artificially. In accordance with the sensory modality involved, the ILAE classifies auras as \*somatosensory aura, \*visual aura, \*auditory aura, \*olfactory aura, \*gustatory aura, \*autonomic aura, \*abdominal aura, and \*psychic aura. The latter class is reserved for hallucinations or illusions of epileptic origin that are not confined to a single sensory modality. Such \*compound hallucinations may be accompanied by \*metamorphopsias (such as \*micropsia or \*macropsia), and/or an alteration in the sense of familiarity (such as derealization, \**déjà vu*, or \**jamais vu*). In rare instances, they may develop into a full-blown \*Alice in Wonderland syndrome. Auras taking the shape of \*complex visual hallucinations are less common and tend to be briefer than stereotyped ones. As to their pathophysiology, it has been suggested that \*stereotyped hallucinations are associated primarily with aberrant neuronal discharges affecting the sensory cortex, whereas complex ones may be associated with discharges affecting the limbic structures.

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- Taylor, I., Scheffer, I.E., Berkovic, S.F. (2003). Occipital epilepsies: Identification of specific and newly recognized syndromes. *Brain*, 126, 753–769.

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### Epileptic Déjà vu

see *Déjà vu*.

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### Epileptic Hallucination

A term used quite loosely to denote a hallucination attributable to focal neuronal discharges affecting any part of the cortical network of perception. For more specific concepts and theories, see the entries *Aura*, *Dreamy State*, *Epilepsy* and *hallucinations*, *Ictal hallucination*, and *Hallucinatory epilepsy*.

**References**

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- Mauguière, F. (1999). Scope and presumed mechanisms of hallucinations in partial epileptic seizures. *Epileptic Disorders*, 1, 81–91.

**Epileptic Synaesthesia**

Also known as seizure-induced synaesthesia. Both terms are used to denote a type of \*synaesthesia (i.e. a member of the group of perceptual phenomena exemplified by \*colour hearing) which falls into the class of \*non-idiopathic synaesthesias. Pathophysiologically, epileptic synaesthesia is associated primarily with partial epileptic seizures affecting the limbic system or temporal lobe. As such, epileptic synaesthesia is also classified as an experiential phenomenon.

**Reference**

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**Epileptic Twilight State**

see Twilight state and hallucinations.

**Episodic Twilight State**

see Twilight state and hallucinations.

**Erethic Hallucination**

The term erethic hallucination is indebted to the Greek verb *erethizein*, which means to irritate, to provoke, to enrage. It was used by the German psychiatrist Karl Ludwig Kahlbaum (1828–1899) to denote a hallucination elicited under the influence of a person's affective state.

**Reference**

- Kahlbaum, K. (1866). Die Sinnesdelirien. *Allgemeine Zeitschrift für Psychiatrie und psychisch-gerichtliche Medizin*, 23, 56–78.

**Erotic Hallucination**

see Sexual hallucination.

**Erythroptasia**

Also known as red vision and Monday morning syndrome. The term erythroptasia comes from the Greek words *eruthros* (red) and *opsis* (seeing). It was introduced in 1895 at a gathering of the *Deutsche Ophthalmologische Gesellschaft* by the German physician Ernst Fuchs (1851–1930), who had experienced the condition himself for several minutes after exposure to sunlight reflected off a snow field. Erythroptasia is classified as a \*chromatopsia (i.e. a temporary aberration of colour vision) in which all objects and visual stimuli appear to be tinged with red. The condition may last anywhere from several minutes to days, and it may affect either one or both eyes, only during the night or during both day and night. Etiologically, erythroptasia is associated primarily with ocular conditions such as aphakia and pseudophakia, with the use of certain therapeutics, and with excessive exposure to bright light. Pathophysiologically, it is associated primarily with ultraviolet or short-wavelength blue light acting either on blue-responsive cones or on other susceptible parts of the optical system. Like other chromatopsias, erythroptasia tends to be classified as an \*entoptic phenomenon. The term is used in opposition to \*cyanopsia (blue vision), \*chloropsia (green vision), \*xanthopsia (yellow vision), and \*ianothinopsia (violet or purple vision).

**References**

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### Esquirol's Definition of Hallucinations

In 1845 the French alienist Jean-Etienne Dominique Esquirol (1772–1840) defined hallucinations as follows. “A person is said to labor under a hallucination, or to be a visionary, who has a thorough conviction of the perception of a sensation, when no external object, suited to excite this sensation, has impressed the senses.”

#### Reference

Esquirol, J.-E.D. (1965). *Mental maladies. A treatise on insanity. A facsimile of the English edition of 1845.* Translated by Hunt, E.K. New York, NY: Hafner Publishing Company.

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### Esquirol's Definition of Illusions

In 1845 the French alienist Jean-Etienne Dominique Esquirol (1772–1840) defined illusions as follows: “In illusions... the sensibility of the nervous extremities is altered: it is exalted, enfeebled, or perverted. The senses are active, and the actual impressions solicit the

reactions of the brain. The effects of this reaction being submitted to the influence of the ideas and passions which control the reason of the insane, they deceive themselves in respect both to the nature and cause of their actual sensations.”

#### Reference

Esquirol, J.-E.D. (1965). *Mental maladies. A treatise on insanity. A facsimile of the English edition of 1845.* Translated by Hunt, E.K. New York, NY: Hafner Publishing Company.

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### Esthetic Illusion

see Aesthetic illusion.

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### Ethanol and Hallucinations

see Alcohol and hallucinations.

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### Excursion of the Ego

see Out-of-body experience (OBE or OBEE).

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### Expectancy Hypothesis of Hallucinatory Experience

A generic term for a group of explanatory models that attribute a major part in the mediation of hallucinations and \*illusions to a person's expectations and attentional modulation. As noted by the American psychiatrist Mardi Jon Horowitz (b. 1934), this cognitive mechanism would seem particularly relevant to the formation of hallucinations and illusions in which an ambiguous stimulus or 'nidus' (such as a tree in the dark) is 'seen' in the form of an expected, feared, or wished-for shape (such as a person with or without malign intentions). In Horowitz's own words, “A fusion of an ambiguous perceptual nidus, a template of expectancy, and an active memory or fantasy image would provide the 'information' and perceptual quality of an hallucination.” Obviously, expectancy alone is not a sufficient condition for the mediation of a hallucination or illusion. Rather, expectancy tends to



Fig. 5 Etienne Esquirol

be conceptualized as a pathoplastic factor which may help to shape or determine the aberrant percept's content. Conscious or subconscious types of expectancy would seem to play an important role in the mediation of a multitude of \*sensory deceptions, including \*hypnotically induced hallucinations, \*reflex hallucinations, \*cognitive illusions, \*pareidolia, \*auditory pareidolia, \*change blindness, \*inattentional blindness, \*inattentional deafness, \*auditory deafness, \*tactile insensitivity, \*visual inattention, the \*verbal transformation effect, the \*electronic voice phenomenon (EVP), and \*daydreaming, as well as in \*apophenia. The \*dissociation model of hallucinatory experience as put forward by the German hallucinations researcher Edmund Parish (1861–1916) may be regarded as one of the most rigorous elaborations of the expectancy hypothesis.

**References**

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Haddock, G., Slade, P.D., Bentall, R.P. (1995). Auditory hallucinations and the verbal transformation effect: The role of suggestions. *Personality and Individual Differences*, 19, 301–306.

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**Experiential Hallucination**

Also referred to as experiential hallucinosis, experiential phenomenon, experiential response, experiential seizure, \*flashback, memory flashback, \*psychical hallucination, and \*reperceptive hallucination. The first five terms were used – and probably also coined – by the Canadian neurosurgeon Wilder Graves Penfield (1891–1976) to denote a lively \*visual, \*auditory, or \*compound hallucination depicting a scene experienced previously by the affected individual (i.e. a reperception). Penfield's ideas on the notion of experiential hallucination stemmed from his cerebral cortical probing experiments in individuals with therapy-resistant epileptic seizures. As he wrote in 1958, “These hallucinations are made up of

elements from the individual's past experiences. They may seem to him so strange that he calls them dreams, but when they can be carefully analyzed it is evident that the hallucination is a shorter or longer sequence of past experience. The subject re-lives a period of the past although he is still aware of the present.”

**References**

Penfield, W. (1958). *The excitable cortex in conscious man*. Springfield, IL: Charles C. Thomas.

Penfield, W. (1975). *The mystery of the mind. A critical study of consciousness and the human brain*. Princeton, NJ: Princeton University Press.

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**Experiential Hallucinosis**

see Experiential hallucination.

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**Experiential Ictal Phenomenon**

A term used to denote a hallucination due to a partial epileptic seizure, notably an \*aura, depicting a lively scene experienced previously by the affected individual.

**Reference**

Mauguière, F. (1999). Scope and presumed mechanisms of hallucinations in partial epileptic seizures. *Epileptic Disorders*, 1, 81–91.

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**Experiential Phenomenon**

see Experiential hallucination.

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**Experiential Projector Model of Hallucinations**

A term that was introduced in or shortly before 1975 by the American psychopharmacologists Ronald K. Siegel and Murray E. Jarvik to denote a hypothetical model for the mediation of hallucinations. The model takes into account (1) the spontaneous mediation of endogenous imagery, (2) the role of arousal in the suppression or release of that imagery, and (3) the role of arousal in the



projection of that imagery either into the 'mind's eye' or the outside world. The experiential projector model proceeds from the notion that the human perceptual system may be characterized as an information-processing system capable of processing sensory input by means of transformation, reduction, elaboration, storage, retrieval, and use. It goes on to suggest that "when the sensory input that would normally give rise to perceptions is absent, man is either thinking, imagining, dreaming, or hallucinating. These quasi-perceptions are forms of mental imagery that lie on a continuum of intensity of vividness, thought images being the least vivid and images of hallucinations being the most vivid. The transition from one form of imagery to another along this continuum depends on the arousal state; when arousal is low, there is still a baseline amount of spontaneous firings by cortical cells in normal waking behavior. This activity is suppressed and inhibited from entering into conscious awareness whenever one is asleep or new information is being scanned and processed. However, some introspection or thinking can retrieve the results of these firings, and they are presented as baseline imagery data. The information is projected in the mind's eye... With low arousal, such experiential projections are weak thought images. When arousal is increased, however, retrieval of information by this system is more successfully obtained... The information may now appear to be more vividly projected and may contain increasing amounts of complex imagination and fantasy imagery. When arousal is further increased, information may appear to be projected on a sensory field outside the body, especially if other sensory inputs are reduced." Due to the authors' affinity with drug-induced hallucinations, and the \*slideframe format in which these may appear, their experiential projector model takes the notion of projection quite literally. In the authors' own words, "Hallucinations occur when imagery is projected outside the observer and is viewed as separate from the projector." Conceptually, the experiential projector model may be seen as a variant of the 19th-century \*perceptual release model.

### Reference

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### Experiential Response

see Experiential hallucination.

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### Experiential Seizure

see Experiential hallucination.

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### Exploding Head Syndrome

Also known as auditory sleep start. The term exploding head syndrome was introduced in or shortly before 1988 by the British neurologist John M.S. Pearce (b. 1936) to denote an abrupt and exceptionally loud \*akoasm (i.e. a nonverbal auditory hallucination) typically reported as sounding like an explosion, a roar, or a ringing noise deep inside the head. This akoasm is usually reported as occurring within an hour or two after falling asleep. Although it is not usually accompanied by a headache, affected individuals may be so overwhelmed by the experience that they do describe it in terms of a headache. After waking up, the individual may experience a sense of anxiety, accompanied by a tachycardia. The exploding head syndrome may occur once only, or repeatedly (albeit irregularly) over a time span of months or even years. It has occasionally been reported as being accompanied by a perceived flash of light. This flash of light is referred to as \*visual sleep start. By analogy, the exploding head syndrome has been designated as an auditory sleep start. The etiology and pathophysiology of the exploding head syndrome are basically unknown. As Pearce speculates, "The syndrome is entirely benign, and I suspect common and underreported. The cause of the bomb-like noise remains a mystery: no known vascular or hydrodynamic changes in the brain, labyrinths, or cerebrospinal fluid would cause such a symptom, although a momentary (almost ictal) disinhibition of the cochlea or its central connections in the temporal lobes, or a sudden involuntary movement of the tympanum or tensor tympani, might be the explanation."

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**References**

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**Exteriorisation of Sensibility**

see Out-of-body experience (OBE or OBEE).

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**External Auditory Hallucination**

A term used to denote an \*auditory hallucination, the apparent source of which is located in extracorporeal space. The term external auditory hallucination is used in opposition to the term \*internal auditory hallucination. Both forms have been reported by individuals with a variety of psychiatric diagnoses, as well as by individuals with no psychiatric diagnosis. Moreover, some individuals experience external as well as internal auditory hallucinations, or are unable to tell the difference. The differential significance of external versus internal auditory hallucinations for the severity of pathology, suggested by no less an authority than the German psychiatrist and philosopher Karl Jaspers (1883–1969), has now been largely discarded. As suggested by the British psychiatrists David Copolov et al. the clarity and distinctness of auditory hallucinations may well have a greater impact on the subjective ‘realness’ of voices than their subjective localization inside or outside the head. It is not unthinkable, however, that the two types of auditory hallucination differ somewhat as to their neurophysiological correlates.

**References**

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- Jaspers, K. (1997). *General psychopathology. Volume 1*. Translated by Hoenig, J., Hamilton, M.W. Baltimore, MA: Johns Hopkins University Press.

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**External Autoscopy**

A term introduced in or shortly before 1903 by the French physician and psychologist Paul Auguste Sollier (1861–1933) to denote a type of \*autoscopy (i.e. ‘seeing one self’) characterized by a \*visual or \*compound hallucination depicting the body’s exterior features. Sollier uses the term external autoscopy in opposition to \*internal autoscopy (i.e. a visual hallucination displaying the body’s internal organs). He classifies both external and internal \*autoscopy hallucinations as \*coenesthetic hallucinations.

**References**

- Denig, T.R., Berrios, G.E. (1994). Autoscopy phenomena. *British Journal of Psychiatry*, 165, 808–817.
- Sollier, P. (1903). *Les phénomènes d’autoscopie*. Paris: Félix Alcan.
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**Extracampine Hallucination**

The term extracampine hallucination is indebted to the Latin words *extra* (outside) and *campineus* (field). It was introduced in or shortly before 1903 by the Swiss psychiatrist Eugen Bleuler (1857–1939) to denote a hallucination that is experienced by the affected individual as being outside the range of ordinary perception. The term extracampine hallucination is usually applied to the visual modality, i.e. to \*visual hallucinations experienced at the back of the head or at other locations outside the regular visual field. In his original paper on the subject Bleuler also mentions two cases of \*tactile extracampine hallucination, one involving a man who felt spurts of water on the back of his hands, and another involving a woman who claimed that she could feel on her skin the movement of mice crawling inside a wall. As pointed out by the Russian neurologist Johann Susmann Galant (1893–1937?), it is not entirely clear whether these case reports are commensurable with the concept of the extracampine hallucination. After all, both individuals experienced tactile hallucinations within the boundaries of their regular sense of touch. It would have been different if they had claimed, for example, that they could feel jets of water or the crawling of mice inside their brain (which has no tactile sense of its own). Perhaps Bleuler’s

inclusion of these examples can be explained by reference to his theoretical supposition that the brain is actively involved in the outward projection of percepts, and that the occurrence of extracampine hallucinations may therefore be regarded as proof of the fallability of the mechanism responsible for this outward projection. Both of Bleuler's examples of the tactile extracampine hallucination would seem to comply with this hypothesis.

#### References

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- Galant, S. (1924). Das Halluzinationsproblem und die Alghallucinosis. *European Archives of Psychiatry and Clinical Neuroscience*, 70, 187–215.
- Sato, Y., Berrios, G. (2003). Extracampine hallucinations. *The Lancet*, 361, 1479–1480.

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### Extrasensory Perception

see Remote viewing.

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### Extrinsic Olfactory Hallucination

The term extrinsic olfactory hallucination is indebted to the Latin words *extrinsecus* (outside), and *ol(e)facere* (to smell). It was introduced in or shortly before 1971 by the Canadian neurologist William E.M. Pryse-Phillips to denote an \*olfactory hallucination (i.e. a hallucination of smell) which the affected individual attributes to an extracorporeal source. The term extrinsic olfactory hallucination is used in opposition to the term \*intrinsic olfactory hallucination (i.e. a hallucination which the affected individual believes is emanating from his or her own body, without the intervention of any outside agency).

#### Reference

- Pryse-Phillips, W. (1971). An olfactory reference syndrome. *Acta Psychiatrica Scandinavica*, 47, 484–509.

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### Ey's Definition of Hallucinations

In 1973 the French psychiatrist Henri Ey (1900–1977) defined hallucinations as follows. “The hallucination is an alteration of the process of objectification that results in the appearance of false objects in the subject's perception. The ‘perception without an object to perceive’ constitutes the completest form of this error of the senses.”

#### Reference

- Ey, H. (1973). *Traité des hallucinations. Tome 1*. Paris: Masson et Cie., Éditeurs.

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### Eye Floaters

see Muscae volitantes.

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### Eyeless Sight

see Eyeless vision.

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### Eyeless Vision

Also known as eyeless sight, skin vision, skin reading, finger vision, dermal vision, dermo-optics, dermo-optical perception, paroptic vision, \*para-optic perception, cutaneous perception, digital sight, and bio-introscopy. All the above terms are used in the parapsychological literature to denote the alleged capability to perceive colours, differences in brightness, and/or formed images through the skin, especially upon touching with the fingertips. The notion of eyeless vision was developed during the era of mesmerism. In 1920, the French author Louis Farigoule (1885–1972), better known as Jules Romain, published an influential account of what he called para-optic perception. During the 1960s the phenomenon became an object of study in the Soviet Union, and, subsequently, in various other countries. In biomedicine eyeless vision is either associated with hysteria, or identified as a type of \*synaesthesia (i.e. a member of the group of perceptual phenomena exemplified by \*colour hearing). In either case the optical phenomena at



**Fig. 6** Eyeless vision

hand are interpreted as \*visual hallucinations that arise simultaneously with – or subsequently to – a tactile stimulus.

#### **References**

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- Guily, R.E. (1991). *Harper's encyclopedia of mystical and paranormal experience*. New York, NY: Castle Books.

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#### **Eye-Movement Phosphene**

see Flick phosphene.

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## Face Hallucination

see Facial hallucination.

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## Faces in the Dark

see Hypnagogic hallucination.

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## Facial Hallucination

Also known as face hallucination. Both terms are used to denote a \*complex visual hallucination depicting one or more faces of humans, humanoid beings, animals, or fantasy creatures. The hallucinated faces may be realistic, but may also have a cartoonish appearance or display distorted features such as prominent eyes and teeth. Facial hallucinations are described in the context of various hallucinatory syndromes, for example, \*Charles Bonnet syndrome, \*hypnagogic hallucinations (also known as 'faces in the dark'), \*peduncular hallucinations, drug-induced hallucinations, and drug-related \*flashbacks. Pathophysiologically, the mediation of facial hallucinations is associated primarily with increased neurophysiological activity in a part of the fusiform gyrus called the fusiform face area, and also in an area in the superior temporal sulcus which is sensitive to observed eye movements and gaze.

J.D. Blom, *A Dictionary of Hallucinations*,  
DOI 10.1007/978-1-4419-1223-7\_6, © Springer Science+Business Media, LLC 2010

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Santhouse, A.M., Howard, R.J., ffytche, D.H. (2000). Visual hallucinatory syndromes and the anatomy of the visual brain. *Brain*, 123, 2055–2064.

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## Fallacia

Latin for mockery, deception, hypocrisy. The term fallacia was formerly used as an umbrella term for hallucinations and \*illusions.

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## Reference

Campbell, R.J. (1996). *Psychiatric dictionary. Seventh edition*. Oxford: Oxford University Press.

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## False Awakening

A term used to denote a dream event characterized by the subjective feeling that one has just awoken. After a false awakening the individual typically sleeps on, dreaming of the day's morning routines or other mundane events. A \*dream during which a false awakening takes place is referred to as a \*double dream, or a 'dream within a dream'. According to the British author Celia Elizabeth Green (b. 1935), "The 'false awakening'... is not a true waking state, but [one] in which the subject seems to be looking back on the dream experiences he has just had, and in which he at first believes himself to be awake."

Conceptually as well as phenomenologically, false awakening is the counterpart of the \*lucid dream (i.e. a dream during which the dreamer is aware that he or she is dreaming). As suggested in 1926 by the French physician Eugène-Bernard Leroy, false awakenings may lie on a continuum with \*hypnagogic hallucinations.

#### References

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- Leroy, E.B. (1926). *Les visions du demi-sommeil (hallucinations hypnagogiques)*. Paris: Félix Alcan.

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### False Bodily Awareness

see Sensed presence.

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### False Hallucination

A term used to denote a \*sensory deception that does not fulfil all the formal criteria of a hallucination proper (such as a \*daydream, a \*hypnagogic hallucination or a \*physiological illusion). The term false hallucination was used by the French psychiatrist Claude-François Michéa (1815–1882) in opposition to the term \*true hallucination, which he used to designate a hallucination that does fulfil all the necessary formal criteria.

#### Reference

- Michéa, C.-F. (1871). *Du délire des sensations*. Paris: Labe.

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### False Paracsis

see Paracsis of Willis.

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### False Proximate Awareness

see Sensed presence.

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### Falsidical Hallucination

A term used in parapsychology to denote a hallucination that has no bearing on actual events in the external world. The term falsidical hallucination is used in opposition to the term \*veridical hallucination. The latter term has various connotations, but in the present situation it is used to denote a hallucination that has a bearing on actual people, objects, or situations from which the \*hallucinator is separated in place and/or time. One could say that according to the biomedical tradition, all hallucinations belong to the class of – what parapsychologists would call – falsidical hallucinations.

#### Reference

- Myers, F.W.H. (1903). *Human personality and its survival of bodily death. Volume I*. London: Longmans, Green, and Co.

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### Familiar

see Incubus.

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### Fantastic Hallucination

see Compound hallucination.

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### Fasting-Induced Hallucination

A term used to denote a hallucination evoked or facilitated by fasting. A conceptual distinction can be made between fasting for dietary reasons, anorexic fasting, forced fasting, and ritualistic fasting. In any case, fasting is a powerful mechanism that can facilitate the mediation of a hallucinatory state, especially in combination with other facilitating mechanisms such as \*sleep deprivation, isolation, \*sensory deprivation, and the use of laxatives. The pathophysiological mechanism underlying fasting-induced hallucinations is basically unknown. However, it has been suggested that a fasting-induced hyperexcitation of the dopaminergic system may play a part in their mediation. Fasting-induced religious, mystical, and hallucinatory experiences have been

reported since ancient times. Conversely, fasting and food refusal (i.e. sitophobia) are sometimes attributed to the influence of \*imperative hallucinations, usually of an auditory nature, which forbid the individual to eat or warn him or her that the food is poisoned or unclean. For example, \*visual hallucinations involving snakes or eyes seen by the affected individuals in the meals offered to them have been reported. In addition, it is known that \*olfactory and \*gustatory hallucinations may convince the affected individual that food is not to be trusted. It is not inconceivable that in such cases the ensuing reactive type of fasting aggravates the hallucinatory state.

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### Fata Bromosa

see Superior mirage.

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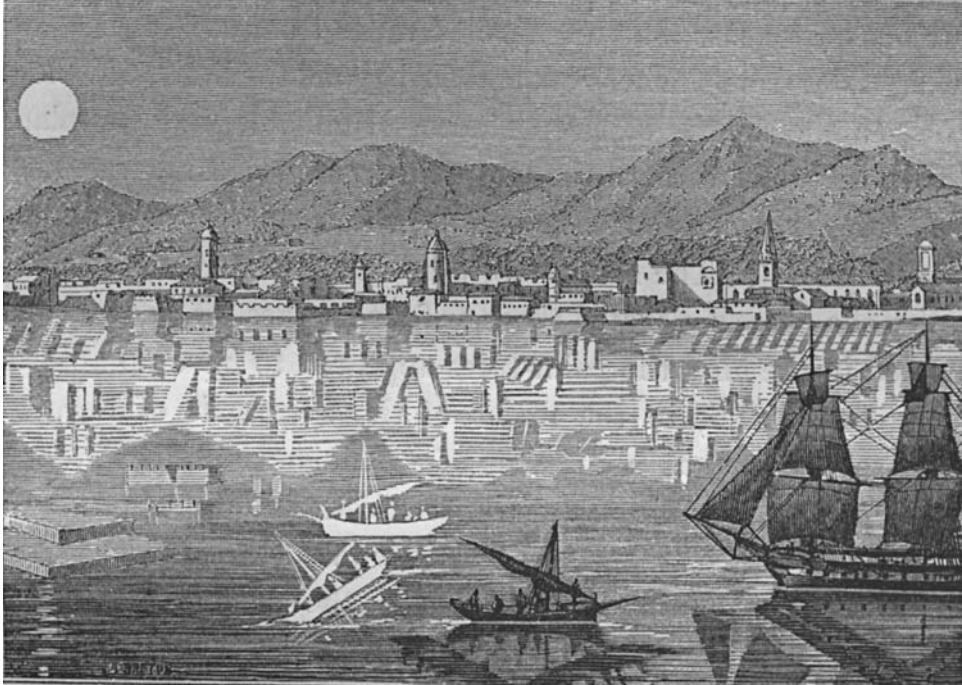
### Fata Morgana

*Fata morgana* is Italian for mirage. The eponym is derived from Morgan le Fay, the name of King Arthur's half-sister, a fairy and shape shifter who features in the *Legend of the Grail*. The term *fata morgana* is used to denote a complex type of what is commonly called a \*superior mirage, i.e. a complex \*physical illusion appearing above the horizon or above a distant object. Like other superior mirages, *fata morganas* are attributed to

the refraction and reflection of light due to the presence of relatively hot air over a cold surface, a condition known as atmospheric temperature inversion. This temperature inversion may in turn be due to the radiative cooling of the earth during the night, or to the presence of warm air over a mass of cold water. The particularly complex mirage images that may occur, consisting of spikes and shoots reminiscent of architectural structures or 'castles in the air', are attributed to discrete temperature inversions in the air. *Fata morganas* are sometimes observed in the morning following a cold night. Especially in calm weather, the interface between warm and cold air near the surface of the ground or water may act as a refracting lens, producing an inverted image over which the distant direct image appears to hover. The turbulence of the air may promote the appearance of elongations and so-called 'dancing spikes', which may cause distant objects to appear elongated and elevated like fairy tale castles. As the British surgeon Walter Cooper Dendy (1794–1871) wrote in 1847, "During this splendid illusion, gigantic columns, and cloud-capped towers, and gorgeous palaces, and solemn temples are floating on the verge of the horizon, and sometimes beneath this picture of a city, on the very bosom of the water, a fainter spectrum may be seen, which is a reflected image of the other. These spectra are usually colourless, but if certain watery vapours are floating in the air, they are beautifully fringed with the three primitive colours of the prism." It has been suggested that the \**hafgerdingar* or 'sea hedges', described in a thirteenth-century Norse manuscript, were in fact a superior mirage or *fata morgana*. The notion of *fata morgana* should not be confused with the notion of *fata morgana of the visual sphere*, which is used to denote a visual distortion called \*visual allachaesthesia. Nor should it be confused with the \*desert hallucination, which has a propensity to occur during the night.

### References

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**Fig. 1** Fata morgana. Source: Flammarion, C. (1873). *The atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

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## Fata Morgana of the Visual Sphere

see Visual allachaesthesia

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## Fechner's Colours

Also known as subjective colours, illusory colours, and flicker colours. The eponym Fechner's colours refers to the German psychologist Gustav Theodor Fechner (1801–1887), who in 1838 published an account involving the creation of illusory colours with the aid of flickering monochromatic light. In this paper Fechner describes how coloured rings appear when a white disc with six black sectors of increasing size is rotated at about 30 revolutions/s. While one would expect to perceive six concentric rings of grey with an increasing saturation, this actually results in pale bands of brown-red, red, green,

blue, and bluish purple. When rotated in the opposite direction, the same colours appear in reverse order. These illusory colours are referred to as pattern-induced flicker colours (PIFCs). The underlying effect is known as the Prévost–Fechner–Benham effect. The neurophysiological correlates of this effect are not entirely understood, but it is believed that both the retina and the primary visual cortex play an active part in the mediation of the ensuing illusory colours. A variant of the device used by Fechner is known as \*Benham's top. Fechner's colours are classified as a \*physiological illusion.

## References

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- Ninio, J. (2001). *The science of illusions*. Translated by Philip, F. Ithaca, NY: Cornell University Press.



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### Feedback Signal

see Reperception.

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### Feeling of a Presence (FOP)

see Sensed presence.

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### Ferenczi's Definition of Hallucinations

In 1919 the Hungarian psychoanalyst Sándor Ferenczi (1873–1933) defined hallucinations as follows. “A hallucination is brought into being when an affect-laden thought complex is blocked by the censorship on its progressive path towards consciousness, and the excitement emanating from it, taking a retrogressive–regressive path, re-occupies the thought's mourning material cumulated in the mind, allowing it to become conscious as an actual percept.”

#### Reference

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### Ferenczi's Definition of Illusions

In 1919 the Hungarian psychoanalyst Sándor Ferenczi (1873–1933) defined \*illusions as follows. “An illusion is a sensory misinterpretation or deformation of an actually present external or internal stimulus.”

#### Reference

Ferenczi, S. (1919). *Hysterische Materialisation-sphänomene. Gedanken zur Auffassung der hysterischen Konversion und Symbolik*. In: Ferenczi, S. (1964). *Bausteine zur Psychoanalyse. Band III: Arbeiten aus den Jahren 1908–1933. Zweite, unveränderte Auflage*. Bern: Verlag Hans Huber.

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### Fiction

see Fiction illusion.

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### Fiction Illusion

Also known as fiction. Both terms refer to a type of \*visual illusion characterized by the absence of a tangible substratum in the extracorporeal world. Some examples of fiction illusions are the \*rainbow, \*Buddha's halo, the \*Ulloa circle, \*Ulloa's bow, \*afterimages, \*scotomata, and the filling-in of the \*blind spot. The term fiction illusion is used in opposition to the terms \*ambiguous illusion, \*distortion illusion, and \*paradox illusion.

#### Reference

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### Fiery Rings of Purkinje

The eponym fiery rings of Purkinje refers to the Bohemian physiologist Johannes Evangelista Purkyně (1787–1869), who is credited with being the first to describe the concomitant phenomenon in his textbook of 1823. The phenomenon consists of two large rings that can be seen after rapid convergence movements of the eyes, especially in a dark environment. It is classified as



**Fig. 2** Fiery rings of Purkinje. Illustration by JDB

a type of \*convergence phosphene, which is in turn classified as an \*entoptic phenomenon or a \*physiological illusion. Because of its occurrence in a dark environment, the phenomenon is also classified as a \*closed-eye hallucination (although the term closed-eye illusion might be more appropriate). The mediation of this phenomenon is associated with the stretching of the optic nerve and the region of the papillae. The term fiery rings of Purkinje is used in opposition to \*dumbbell phosphene. Conceptually and phenomenologically, it is considered closely akin to \*Moore's lightning streaks and the \*flick phosphene.

#### References

- Purkyně, J.E. (1823). *Beobachtungen und Versuche zur Physiologie der Sinne I*. Prague: Calve.  
 Tyler, C.W. (1978). Some new entoptic phenomena. *Vision Research*, 18, 1633–1639.

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### Figment

A term used to denote a half-formed, fragmentary sound that remains below the level of a recognizable percept. The auditory perception of figments can occur in the context of a \*migraine aura, \*delirium, and other CNS disorders. In such cases auditory 'filling in' may lead to the mediation of \*auditory illusions. Similarly, the term figment is used to denote a half-formed, fragmentary image perceived in the visual modality.

#### Reference

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### Figure-Ground Vase

see Rubin's figure.

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### Filigree

see Chessboard design.

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### Filled-Space Illusion

see Oppel–Kundt illusion.

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### Filled/Unfilled Space Illusion

see Oppel–Kundt illusion.

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### Finger Vision

see Eyeless vision.

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### Fischer's Definition of Hallucinations

In 1969 the American psychopharmacologist Roland Fischer defined hallucinations as follows. "Hallucinations can be defined as intense sensations with simultaneously inhibited or even blocked intention and ability to verify those sensations through voluntary motor performance."

#### Reference

- Fischer, R. (1970). Prediction and measurement of perceptual-behavioral change in drug-induced hallucinations. In: *Origin and mechanisms of hallucinations. Proceedings of the 14<sup>th</sup> annual meeting of the Eastern Psychiatric Research Association held in New York City, November 14–15, 1969*. Edited by Keup, W. New York, NY: Plenum Press.

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### Flashback (Drug Related)

Also known as flashback phenomenon. The introduction of the term flashback is attributed to the American psychiatrist Mardi Jon Horowitz (b. 1934). Horowitz used the term in 1969 to denote a return of hallucinations, \*illusions, or \*sensory distortions after the use of a \*hallucinogen – or, more specifically, after the immediate effects of a hallucinogen have worn off. As Horowitz maintains, "Flashbacks are peremptory and recurrent intrusions into awareness long after the ingested drug has worn off. The most common and clearest content of the

flashbacks seems to involve the visual sensory system, but flashbacks have been reported in any sensory modality: taste, smell, touch, kinesthetics, vestibular changes, and auditory images. In addition, distortions of time sense, self-image, or reality sense may occur." Since the 1970s the term flashback has been used to denote any \*sensory deception or distortion that may arise either as a consequence of the prior use of a chemical substance, as a consequence of electrical stimulation of the cortex, or in the context of post-traumatic stress disorder (PTSD). For the latter type of flashback, see the entry Post-traumatic flashback. For flashbacks as a consequence of electrical stimulation, see the entry Cortical probing and hallucinations. The drug-related type of flashback can occur up to months or even years after the exposure to a \*deliriant or other \*hallucinogen. Some examples of deliriants associated with flashback phenomena are ergine, harmaline, harmine, ibogaine, ketamine, LSD, mescaline, ololiuqui, PCP, psilocin, and psilocybin. Drug-related flashback phenomena tend to occur to the waking mind, and to a clear sensorium, although it has been suggested that the incidence of LSD-induced flashbacks is higher during episodes of cannabis intoxication. They typically last for a fraction of a second to several minutes. Their nature and content can be as diverse as the acute effects of hallucinogen intoxication. They tend to be experienced in the form of exact phenomenological replicas of prior perceptual experiences, but they can also evolve into, or be replaced by, novel images. Attempts at systematization have yielded a rudimentary subdivision of flashbacks into visual flashbacks, somatic flashbacks, and emotional flashbacks. The group of visual flashbacks has been further divided into visual distortions, heightened imagery, and \*visual hallucinations. Horowitz himself proposed a dichotomous subdivision of flashbacks, yielding a category dubbed 'spontaneous return of perceptual distortions', and a second one dubbed 'increased susceptibility to spontaneous imagery'. The American psychopharmacologist Henry David Abraham distinguishes no fewer than 16 categories of visual distortions occurring in the context of visual flashbacks, comprising acquired colour confusion, dyslexia due to positive and negative \*afterimages interfering with the reading process, flashes of colour, \*geometric hallucinations such as sparkles, visual fireworks, \*lattices, and large, transparent blobs (referred to by Abraham as \*pseudohallucinations),

geometric \*phosphenes, \*halos around objects, \*illusions of movement, \*imagistic phosphenes, intensified colours (i.e. \*hyperchromatopsia), \*macropsia, \*micropsia, \*negative afterimages, \*positive afterimages, \*pareidolias, \*trailing phenomena, and peripheral percepts. The visual hallucinations of flashback imagery tend to be \*geometric or \*complex in nature, whereby the latter depict people, faces (i.e. \*facial hallucinations), animals (i.e. \*zoopsia), landscapes, and so on. Individuals having experienced flashbacks tend to report that their phenomenological qualities are different from regular sense perceptions, and that their content tends to be frightening in nature. The lifetime prevalence of flashbacks in cross-sectional studies among former and present LSD users is reported to range from 15 to 77%. As to their pathophysiology, various hypotheses have been proposed, the most important of which is a variant of the \*perceptual release theory. It has been suggested that flashbacks may be related conceptually as well as phenomenologically (and perhaps also pathophysiologically) with other mnestic events such as \*hallucinogen-induced persistent perception disorder (HPPD), \*flashbacks in PTSD, \*palinopsia, \*reperceptive hallucinations, \*phantom pain, \*eidetic imagery, and \*flashbulb memories.

#### References

- Abraham, H.D. (1983). Visual phenomenology of the LSD flashback. *Archives of General Psychiatry*, 40, 884–889.
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- Sierra, M., Berrios, G.E. (2000). *Flashbulb and flashback memories*. In: *Memory disorders in psychiatric practice*. Edited by Berrios, G.E., Hodges, J.R. Cambridge: Cambridge University Press.

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#### Flashback (in PTSD)

see Post-traumatic flashback.

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#### Flashback Phenomenon

see Flashback (drug related).

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## Flashbulb Memory

A term introduced in or shortly before 1977 by the American psychologists Roger William Brown (1925–1997) and James Kulik to denote a detail-perfect memory of an event that at the time of witnessing had evoked a high level of surprise, as well as a high level of consequentiality and/or emotional arousal. Some examples of such notable events given by Brown and Kulik are the assassinations of John F. Kennedy, Robert Kennedy, and Martin Luther King. Brown and Kulik suggest that such events are capable of mediating the taking of a ‘mental photograph’ that preserves the scene in its entirety, and in great detail. Flashbulb memories tend to be classified as memory images not hallucinations. However, it has been suggested that they are related in a conceptual and phenomenological sense (and perhaps also in a pathophysiological sense) with other mnemonic events such as \*flashbacks in PTSD, drug-related \*flashbacks, \*hallucinogen-induced persistent perception disorder (HPPD), \*palinopsia, \*phantom pain, \*reperceptive hallucinations, and \*eidetic imagery. Whether the phenomenological characteristics of flashbulb memories warrant their treatment as an independent category of mnemonic phenomena is still a subject of debate. The claim of phenomenological accuracy in particular has been disputed, as well as the existence of a visual imagery memory system dedicated to producing flashbulb memories.

### References

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## Flaubert, Gustave (1821–1880)

A French writer who from 1844 onwards experienced \*photisms and \*visual hallucinations in the context of recurring epileptic seizures. Although his first generalized seizure occurred in 1844, it has been speculated that Flaubert

may have suffered from epilepsy at a much earlier age. As a child he would seem to have experienced \*aural phenomena such as absences and hallucinations. During the year following his first epileptic seizure he had daily recurring visual hallucinations in the form of flames, Bengalese lights, and fireworks. These were characterized by bright, exploding colours. In addition, he experienced \*macropsia with \*zoom vision. The seizures may have come to a halt between 1852 and 1857. It is known that Flaubert also suffered from syphilis, but in view of the early onset of his seizures, a causal relation is unlikely. Other diagnoses suggested in the literature include migraine and hysteria.

### References

- Arnold, L.M., Baumann, C.R., Siegel, A.M. (2007). Gustav Flaubert’s “nervous disease”: An autobiographic and epileptological approach. *Epilepsy and Behavior*, 11, 212–217.
- Lapp, J.C. (1956). Art and hallucination in Flaubert. *French Studies*, 10, 322–334.

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## Flick Phosphene

Also known as eye-movement phosphene. The term flick phosphene was introduced in or shortly before 1957 by the American ophthalmologist Bernard R. Nebel, who had observed the concomitant phenomenon in himself. The term is used to denote a type of \*phosphene (i.e. a transient flash or spark of light) that can be evoked under physiological circumstances by rapid eye movements (REMs). As described by Nebel, “The ‘flick phosphene’ is best observed in the dark-adapted well-rested eye, i.e. before dawn after a restful sleep. Then if one flicks the eyes, e.g. from left to right, with the lids closed, one observes in each monocular field the short-lived appearance of a bright pattern.” This pattern tends to be sheaf like, and to point in the direction of the sudden eye movement. Its colour is usually whitish, with some blue or orange added against the darkness of the background. The flick phosphene is classified as an \*entoptic phenomenon. It is traditionally attributed to a primary deformation of the retina, caused by the torsional forces of relative movement occurring at the interface of retina and vitreous. Conceptually as well as phenomenologically, the flick

phosphene is considered closely akin to \*Moore's lightning streaks and the \*fiery rings of Purkinje. The term is used in opposition to the terms \*convergence phosphene, \*movement phosphene, and \*sound phosphene.

#### Reference

Nebel, B.R. (1957). The phosphene of quick eye motion. *Archives of Ophthalmology*, 58, 235–243.

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### Flicker colours

see Fechner's colours.

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### Flicker-Induced Hallucination

see Photically induced hallucination.

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### Flickering Consciousness

see Dream scintillation.

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### Flittering Scotoma

see Fortification spectrum.

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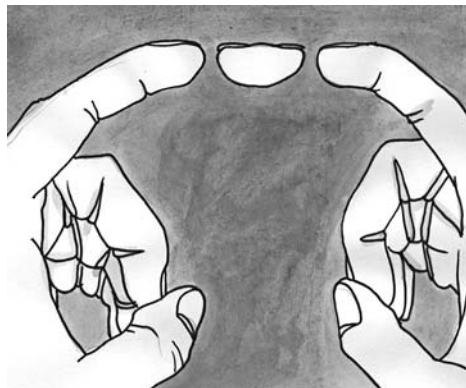
### Floaters

see *Muscae volitantes*.

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### Floating-Finger Illusion

A term introduced in or shortly before 1928 by the American psychologist Winford Lee Sharp (1890–1975) to denote a \*visual illusion that can be induced by placing the index fingers of each hand horizontally in front of the eyes, at a distance of about 30 cm, with the fingertips touching, and one's gaze focused on a point in the distance. When the fingertips are then drawn apart, a seemingly disembodied finger can be perceived, with two ends, apparently floating in mid-air. The floating-finger illusion is generally regarded



**Fig. 3** Floating-finger illusion. Illustration by JDB

as a \*binocular illusion. It can also be classified as a \*phantom sensation or a \*body schema illusion.

#### Reference

Sharp, W.L. (1928). The floating-finger illusion. *Psychological Review*, 35, 171–173.

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### Floor-On-Ceiling Phenomenon

see Environmental tilt.

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### Fly Mushroom and Hallucinations

see *Amanita reverie*.

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### Focal Hallucination

A term used to denote a hallucination that is attributable to a focal or partial epileptic seizure, as in the \*irritative type of hallucinations as envisaged by the American ophthalmologist David Glendenning Cogan (1908–1993). Focal hallucinations tend to be brief and stereotyped. Theoretically, they can affect any of the sensory modalities.

**Reference**

Cogan, D.G. (1973). Visual hallucinations as release phenomena. *Albrecht von Graefes Archiv für Klinische und Experimentelle Ophthalmologie*, 188, 139–150.

**Fogbow**

see Ulloa circle.

**Food Refusal and Hallucinations**

see Fasting-induced hallucination.

**Force-Movement Illusion**

A term used to denote a variant of the group of \*motor illusions characterized by a misperception of limb position due to the forces generated by that limb against a force that moves it in the opposite direction. For example, if a subject is given the task of generating a changing isometric force against a force that is flexing the limb, the limb will be perceived as being flexed more than it actually is.

**Reference**

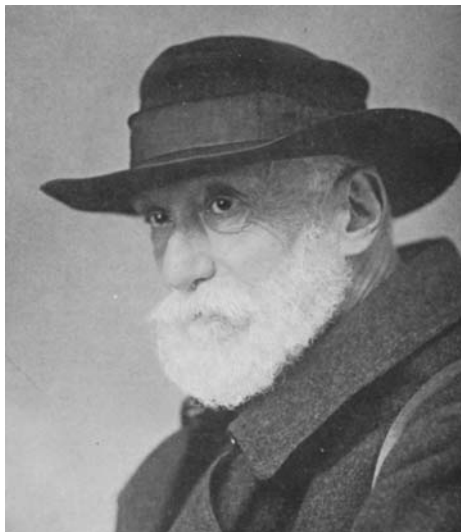
Jones, L.A. (1988). Motor illusions: What do they reveal about proprioception? *Psychological Bulletin*, 103, 72–86.

**Forel's Definition of Hallucinations**

In 1903 the Swiss psychiatrist, hypnotist, and entomologist August Forel (1848–1931) defined hallucinations as follows. “If the patient sees, hears, or feels things when in reality no corresponding stimuli have affected his eyes, ears, or skin this is called *hallucination* (for example, when he hears the voice of an acquaintance who has not spoken or is not there at all).”

**Reference**

Forel, A. (1907). *The hygiene of nerves and mind in health and disease*. Translated by Aikins, H.A. New York, NY: G.P. Putnam's Sons.



**Fig. 4** August Forel

**Forel's Definition of Illusions**

In 1903 the Swiss psychiatrist, hypnotist, and entomologist August Forel (1848–1931) defined illusions as follows. “By *illusion* . . . we mean an incomplete hallucination, in which, for example, one sees some friend with a black face, fiery eyes, and horns on his head, when the friend is really there, but the diabolical accessories are not.”

**Reference**

Forel, A. (1907). *The hygiene of nerves and mind in health and disease*. Translated by Aikins, H.A. New York, NY: G.P. Putnam's Sons.

**Form-Constant**

The term form-constant was coined in or shortly before 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to denote a recurring geometric element or form that can be observed during the initial stages of \*visual hallucinatory experience



**Fig. 5** Heinrich Klüver

due to mescaline intoxication. Although Klüver himself stresses the near impossibility of classifying the variety of visual phenomena occurring during the mescal state, he proposes a classification of form-constants comprising (1) \*chessboard design (also referred to as grating, lattice, fretwork, filigree, and honeycomb), (2) \*cobweb figure, (3) \*tunnel (also referred to as funnel, alley, cone, and vessel), and (4) \*spiral. As Klüver maintains, “No matter how strong the inter- and intra-individual differences may be, the records are remarkably uniform as to the appearance of . . . forms and configurations. We may call them *form-constants*, implying that a certain number of them appear in almost all mescal visions and that many ‘atypical’ visions are upon close examination nothing but variations of these form-constants.” Klüver’s form-constants are not exclusively associated with mescaline intoxication. They have been reported in association with the use of other \*hallucinogens as well, and also in association with non-drug-related phenomena such as \*migraine aura, \*aura due to epileptic activity, and \*hypoglycaemia. Nor would it seem that Klüver was the first to notice the recurrence of certain forms and patterns in hallucinatory images. As early as 1899, the French physician Pierre Dheur had already reported on various

stereotyped patterns of movement and disappearance in \*visual hallucinations. An alternative classification of form-constants, referred to as \*dimensions of visual imagery, was devised during the early 1970s by the American psychopharmacologists Ronald K. Siegel and Murray E. Jarvik.

### References

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### Formed Hallucination

Also known as formed visual hallucination, formed vision, organized hallucination, and \*morphopsia. All five terms are used to denote a visual hallucination depicting a distinctive shape, pattern, object, or scene. Thus the category of formed hallucinations comprises the group of \*geometric hallucinations, as well as the group of \*complex visual hallucinations. The notion of formed hallucination derives from a classification of visual hallucinations that employs phenomenological form as a guiding principle. It is used in opposition to the notion of \*unformed hallucination. Although it has traditionally been used with regard to the visual modality, the term formed hallucination can also denote an auditory hallucination which exceeds the level of static noise or \*figments.

### Reference

- Ey, H. (1973). *Traité des hallucinations. Tome 1*. Paris: Masson et Cie, Éditeurs.

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## Formed Vision

see Formed hallucination.

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## Formed Visual Hallucination

see Formed hallucination.

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## Formication

see Formicative hallucination.

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## Formicative Hallucination

Also referred to as formication, dermatozoic hallucination, and insect hallucination. The terms formication and formicative hallucination are indebted to the Latin noun *formica*, which means ant. All of the above four terms are used more or less interchangeably to denote the hallucinated feeling of ants or other bugs crawling upon or beneath the skin. Formicative hallucinations may be accompanied by pruritus and scratching, which may entail even more pruritis, and hence an aggravation of the formicative hallucinations. Their occurrence is associated primarily with the use of (or more likely, withdrawal from) substances such as cocaine, amphetamines (including the therapeutic methylphenidate), and alcohol. They can also occur in the context of \*alcoholic hallucinosis, and in association with a variety of somatic conditions such as \*delirium, high fever, diabetic neuropathy, herpes zoster, and peripheral nerve regeneration or neuropathy, as in \*Tinel's sign of formication. They have also been described in association with psychiatric disorders such as bipolar disorder and somatoform disorder. Formicative hallucinations may be accompanied by delusional parasitosis, a condition also referred to as Ekbohm's syndrome, after the Swedish neurologist Karl Axel Ekbohm (1907–1977). They may also be accompanied by \*visual hallucinations of insects, which may be regarded by the affected individual as confirmation of an actual bug infestation. The term \*chronic tactile hallucinosis is used to denote a

syndrome characterized by formicative hallucinations, parasitic or other dermatozoic delusions, and a chronic course which is believed to occur mainly in women of 50 years of age and older. When formicative hallucinations are attributed to the chronic use of cocaine, they are referred to as \*cocaine bugs, \*Magnan's sign, or Magnan–Saury's sign. When they occur in the context of amphetamine use they are known as \*crank bugs. Formicative hallucinations are classified either as \*tactile hallucinations or as \*paraesthesias. They should not be confused with hallucinations due to \*ant ingestion.

## References

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## Fortification Figure

see Fortification spectrum.

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## Fortification of Vauban

Also known as fortification figure, \*fortification spectrum, fluttering scotoma, geometrical spectrum, herringbone, Norman arch, \*scintillating scotoma, telehopsia, and \*teichopsia. The introduction of the eponym fortification of Vauban stems from the British neurologist Sir William Richard Gowers (1845–1915). Gowers introduced the term in honour of the French engineer Sébastien le Prestre Vauban (1633–1707), who was the first to describe the zigzag type of fortification wall as the most effective structure for the defence of fortresses. Today the term fortification of Vauban is used to denote a \*geometric visual hallucination consisting of an extremely bright, sometimes coloured, zigzag line, or 'fortification wall', that may begin near the fovea in one hemifield, and then spread out towards the periphery of the same hemifield without touching the vertical meridian. For a further description





**Fig. 6** Expanding fortification spectra. Source: Gowers, W.R. (1904). *Subjective sensations of sight and sound: Abiotrophy, and other lectures*. Philadelphia, PA: P. Blakiston's Son & Co

of this phenomenon, see the entry Fortification spectrum.

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## Fortification Spectrum

Also known as fortification figure, \*fortification of Vauban, geometrical spectrum, herringbone, fluttering scotoma, Norman arch, \*scintillating scotoma, telehopsia, and \*teichopsia. The introduction of the term fortification spectrum is commonly attributed to the British physician

John Fothergill (1712–1780). It is used to denote a \*geometric visual hallucination consisting of an extremely bright, sometimes coloured, zigzag line, or ‘fortification wall’, that may begin near the fovea in one hemifield, and then spread out towards the periphery of the same hemifield without touching the vertical meridian. This bright zigzag line may have a pulsating, scintillating, flashing, or flickering quality, and it may be followed (or occasionally preceded) by a region of \*blindness or negative \*scotoma of the same form. The phenomenon has been known and described since ancient times. Some authors credit the German abbess and mystic \*Hildegard of Bingen (1098–1180) with providing the first detailed description of the fortification spectrum *avant la lettre*. A historical description of the fortification spectrum by the British physician and *migraineur* Hubert Airy (1838–1903) runs as follows. “When it was at its height it seemed like a fortified town with bastions all around it, these bastions being coloured most gorgeously . . . All the interior of the fortification, so to speak, was boiling and rolling around in a most wonderful manner as if it was some thick liquid all alive.” Etiologically, the fortification spectrum is associated primarily with paroxysmal neurological conditions such as migraine with aura, \*migraine aura without headache, and epilepsy. Pathophysiologically, it is associated primarily with a spread of neural activation (sometimes followed by a neural depression) across a retinotopically organized part of the visual system, notably striate cortex (more specifically, the cortical areas V1 or V3a). The speed of this spreading depression-like process is estimated as lying between 2 and 3 mm/min. The fortification spectrum is commonly classified as a \*geometric hallucination. As such, it is believed to come second in a classic series of geometric hallucinations associated with migraine (consisting of \*phosphenes, fortification spectra, and intricate, rapidly changing geometrical patterns). When it moves across the visual hemifield, it can also be classified as a \*moving scotoma. A relatively rare variant of the fortification spectrum is the \*bilateral scotoma, which develops symmetrically in both hemifields, and may constitute a central or pericentral scotoma called a \*rainbow spectrum. As noted by the British neurologist Oliver Wolf Sacks (b. 1933), “The existence of such scotomata poses very difficult problems to those who postulate a local, unilateral process as the basis of migraine auras.”

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### Four-Factor Model of Hallucinations

A hypothetical model for the mediation of \*auditory hallucinations proposed in or shortly before 1976 by the British psychologist Peter D. Slade. The model identifies four important antecedents of hallucinatory behaviour, comprising psychological stress, \*hallucinatory predisposition, environmental stimulation, and reinforcing consequences for the \*hallucinator.

### References

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### Frégoli Syndrome for Place

see Frégoli's phenomenon.

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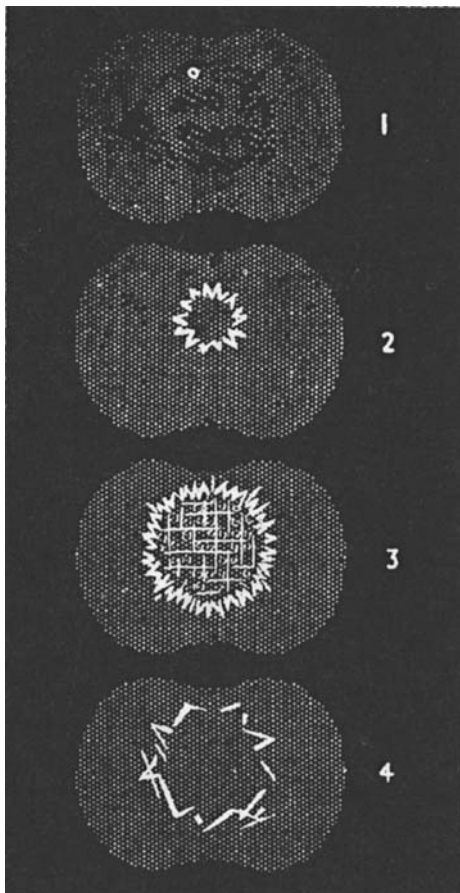
### Frégoli's Illusion

see Frégoli's phenomenon.

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### Frégoli's Phenomenon

Also referred to as Frégoli's syndrome, Frégoli syndrome, and Frégoli's illusion. All four



**Fig. 7** Pericentral scotoma. Source: Gowers, W.R. (1904). *Subjective sensations of sight and sound: Abiotrophy, and other lectures*. Philadelphia, PA: P. Blakiston's Son & Co

eponyms are used to denote a \*misidentification syndrome characterized by the conviction that a certain individual can take on the physical features of other individuals, and that he or she may thus appear as a family member, a neighbour, a stranger in the street, a doctor, etc. The syndrome has been designated as resulting from a form of hyperidentification or over-personalization. The eponym Frégoli's phenomenon refers to the Italian actor Léopoldo Frégoli (1867–1936), who reportedly had an unusual talent for impersonating widely differing characters. It was introduced in 1927 by the

French psychiatrists Paul Courbon (1879–1958) and G. Fail. The expression *Frégoli syndrome for place* is used to denote a condition in which the affected individual's current environment (such as a hospital) is misidentified as a different place (such as one's home or one's place of birth). In the older literature the latter condition is sometimes referred to as reduplicative paramnesia. Pathophysiologically, Frégoli's phenomenon is associated primarily with lesions affecting the right frontal lobe, although different locations have been reported as well. Conceptually as well as phenomenologically, Frégoli's phenomenon is related to the \*intermetamorphosis syndrome, which is characterized by the conviction that particular individuals have been transformed – with respect to their physical appearance as well as their personality traits – into other people.

### References

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### Frégoli's Syndrome

see Frégoli's phenomenon.

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### Fretwork

see Chessboard design.

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### Freud, Sigmund (1856–1939)

An Austrian psychiatrist and neurologist, and founder of psychoanalysis, who experienced vivid

\*verbal auditory hallucinations in which his name was called out. Apparently Freud was inclined to consider these as \*telepathic or at least \*coincidental hallucinations. As he wrote, "During the days when I was living alone in a foreign city . . . I quite often heard my name suddenly called by an unmistakable and beloved voice; I then noted down the exact moment of the hallucination and made anxious enquiries of those at home about what had happened at that time. Nothing had happened."

### References

- Freud, S. (1941). *Zur Psychopathologie des Alltagslebens*. In: Freud, S. *Gesammelte werke. Vierter Band*. Frankfurt am Main: S. Fischer Verlag.
- Watkins, J. (2008). *Hearing voices. A common human experience*. Melbourne: Michelle Anderson Publishing.

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### Freud's Opinion on Hallucinations

In 1937 the Austrian founder of psychoanalysis Sigmund Freud (1856–1939) characterized hallucinations as follows. "Perhaps it may be a general characteristic of hallucinations to which sufficient attention has not hitherto been paid that in them something that has been experienced in infancy and then forgotten re-emerges – something that the child has seen or heard at a time when he could still hardly speak and that now forces its way into consciousness, probably distorted and displaced owing to the operation of forces that are opposed to its re-emergence."

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- Freud, S. (1937). *Constructions in analysis*. In: *Sigmund Freud. Collected papers. Volume V*. (1959). Translated by Strachey, J. Edited by Jones, E. New York, NY: Basic Books.
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### Functional Hallucination

Historically the term functional hallucination has had a variety of meanings and connotations. The German expression *funktionelle Hallucination* was introduced in or shortly before 1866 by the German psychiatrist Karl Ludwig Kahlbaum (1828–1899). Kahlbaum used it to denote a hallu-

ination prompted by a shift of attention towards a particular external object or stimulus, such as the picture of a deceased loved one, or the sound of footsteps coming down the hallway. Seeing that picture, or hearing those footsteps, the affected individual experiences a \*vision depicting the beloved. Thus functional hallucinations as described by Kahlbaum are conceptually related to \*reflex hallucinations and \*synaesthesias. The term was used in a slightly different manner by the German psychiatrist and philosopher Karl Jaspers (1883–1969), as witness the following example. “A patient, for instance, hears voices while the water is running but they stop when the tap is turned off. He hears the running water and the voices simultaneously.” According to Jaspers, voices of this particular kind should not be confused with \*illusions, since “illusions contain an element of genuine perception [whereas] with functional hallucinations we have simultaneous hallucinations running alongside with a constant element of genuine sense-perception and disappearing at the same time as the sense-perception.” The hallucinatory state described by Jaspers is also referred to as \*functional hallucinosis. A third use for the term functional hallucination is suggested by the American psychiatrist Gordon Forrer, who maintains that, “Functional hallucinations are sensory perceptions for which no physical cause can be assigned.” Forrer sees an apt example of a functional hallucination in \*hallucinated pain, a type of pain which lacks the physical basis of tissue damage which it suggests, and yet is experienced in the form of a sensory percept. In Forrer’s opinion, the central function of this type of functional hallucination is “its stimulus filling effect upon threatening or actual psychological emptiness.” Thus, according to Forrer, subconsciously the affected individual would seem to prefer pain over a looming feeling of emptiness.

#### References

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Fig. 8 Sir Francis Galton

Kahlbaum, K. (1866). Die Sinnesdelirien. *Allgemeine Zeitschrift für Psychiatrie und psychisch-gerichtliche Medizin*, 23, 56–78.

#### Functional Hallucinosi

A term used to denote a hallucinatory state co-occurring with sensory stimulation of the same sensory modality. An example of functional hallucinosis is the occurrence of \*auditory hallucinations against a background of machine noises or the sound of running water. Such auditory hallucinations typically disappear when the sound of the machine or the running water comes to a halt. The concomitant hallucinatory percepts are designated by the German psychiatrist and philosopher Karl Jaspers (1883–1969) as \*functional hallucinations. As a nosological category, functional hallucinosis is classified as a specific type of \*hallucinosis syndrome.

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*Journal of Neurology, Neurosurgery and Psychiatry*, 64, 259–261.

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**Funnel**

see Tunnel.

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### Galton's Definition of Hallucinations and Illusions

In 1883 the British scientist Sir Francis Galton (1822–1911) defined hallucinations and illusions as follows: “Hallucinations are defined as appearances wholly due to fancy; illusions, as fanciful perceptions of objects actually seen.”

#### Reference

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### Ganglionic Hallucination

The term ganglionic hallucination is indebted to the Greek noun *gagglion* (i.e. ganglion), which refers to a collection of nerve cells acting as a centre of neurotransmission. It was introduced by the 19th-century French dream researcher Maurice Macario to denote a \*somatic hallucination mediated by the sympathetic nerve. Macario suggests that ganglionic hallucinations may well constitute the physiological correlate of many complaints in hypochondriasis. He uses the term ganglionic hallucination in opposition to \*sensorial hallucination, \*intuitive hallucination, and \*sthenic hallucination.

#### Reference

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### Ganglionic Illusion

The term ganglionic illusion is indebted to the Greek noun *gagglion* (i.e. ganglion), which refers to a collection of nerve cells acting as a centre of neurotransmission. It was introduced in or shortly before 1832 by the French alienist Jean-Etienne Dominique Esquirol (1772–1840) to denote an \*illusion based on a misinterpretation rather than a misperception of perceptual stimuli and objects. Some examples of ganglionic illusions are cases in which pebbles are held for gems or pieces of simple metal for silver or gold. Esquirol uses the term ganglionic illusion in opposition to the term \*illusion of the senses. Conceptually as well as phenomenologically, Esquirol's notion of ganglionic illusion would seem to be compatible with the notion of \*delirium of judgment as defined by the Russian psychiatrist Victor Kandinsky (1849–1889). Judging by the examples given by Esquirol, ganglionic illusions would today probably be designated as delusions rather than illusions.

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## Garden Hose Bow

see Rainbow.

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## Gedankenhören

see *Gedankenlautwerden*.

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## Gedankenlautwerden

Also known as *Gedankenhören*. Both German expressions translate into English as thought-echo, thought echoing, thoughts-out-loud, thought audition, or audible thinking, and into French as *écho de la pensée*. All of these terms refer to a \*verbal auditory hallucination (VAH) echoing the contents of the \*hallucinator's conscious thoughts. The term *Gedankenlautwerden* was coined by the German psychiatrist August Cramer (1860–1912). In 1889, Cramer designated this symptom as “the patients’ sensation that all their thoughts are spoken within their chest, or that these are repeated and cried out loudly, or that these resonate within some accidental rustling sound in the external world.” Although Cramer introduced the notion of *Gedankenlautwerden*, and also provided the first systematic study of the phenomenon, he acknowledged that it had been referred to by many authors before him. The Russian psychiatrist Victor Kandinsky (1849–1889), for example, had discussed it at length in his 1885 work on \*sensory deceptions, and in 1889, the year of Cramer’s publication on the subject, the German psychiatrist Emil Kraepelin (1856–1926) devoted attention to it in the third edition of his textbook under the heading *Doppeldenken*. With hindsight, it would seem that the *Gedankenlautwerden* phenomenon was conceptualized by many authors, including

Cramer himself, in a much broader sense than is customary today. For example, the sensation of thoughts spoken aloud in one’s chest, included in Cramer’s description, shows a significant overlap with the notion of \*extracampine hallucination introduced in 1903. The sensation of one’s thoughts resonating “within some accidental rustling sound in the external world”, also referred to by Cramer, has since 1908 been designated as \*indirect *Gedankenlautwerden*. The concept’s lack of uniformity was noted as far back as 1900 by the German neurologist Carl Wernicke (1848–1904), who felt that “the ‘Gedankenlautwerden’ symptom should be understood as narrowly as possible, and in the sense that the thoughts, which are recognized by the patient as being his or her own, sound aloud at certain occasions, such as when the patient is reading or writing. Unfortunately Cramer himself, as well as all of his followers, conceived the symptom so broadly that it completely lost its original value as an elementary symptom.” Today the variant of *Gedankenlautwerden* in which reading is accompanied by an audible echo of the words read is known as \*echo of reading. Thus it would seem that even Wernicke’s definition of *Gedankenlautwerden* can be criticized as being too broad. As to the phenomenon’s mediation, Cramer attributes *Gedankenlautwerden* to a duplex action of the cerebral hemispheres. The German psychiatrist Hubert Grashey (1839–1914), by contrast, attributes it to an aberrant excitation of the cerebral sensory cortex, concomitant with regular thinking (i.e. as a \*reperception phenomenon). The Swiss physiologist Johann Ignaz Hoppe (1811–1891) suggests that it may stem either from secondary peripheral excitation (i.e. of the auditory nerve) or from \*subvocalization. A variant or special case of *Gedankenlautwerden* is the hallucination in \*braille. Phenomenologically, *Gedankenlautwerden* shows a certain similarity to \*palinacsis, a phenomenon characterized by the echoing or perseverance of auditory stimuli derivative of the external environment. Although the two phenomena are generally considered different symptoms, both have been described in the context of temporal lobe epilepsy.

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### Gélineau's Disease and Hallucinations

see Narcolepsy and hallucinations.

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### General Elementary Somatopsychosis

see Acenesthesia.

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### Generalized Anaesthesia

see Total anaesthesia.

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### General Paresis and Hallucinations

see Syphilitic hallucinosis.

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### Genital Hallucination

The term genital hallucination comes from the Latin adjective *genitalis*, which means fertile, intended for procreation. It is used to denote a hallucination affecting the reproductive organs of the male or female, i.e. the penis, testes, and/or related structures in men, or the vulva, vagina, uterus, and/or related structures in women. The genital hallucination tends to be classified either as a variant of the \*tactile or haptic hallucination or as a variant of the \*sexual or erotic hallucination. When orgasmic feelings are involved, it may be part of the \*persistent sexual arousal syndrome (PSAS). In the case of sensations that

would seem to come from inside the body, and for which no organic substratum can be found, the genital hallucination may be considered a variant of the \*somatic hallucination. As noted by the Swiss psychiatrist Eugen Bleuler (1857–1939), tactile and somatic hallucinations occurring in the context of \*psychosis often seem to start out as genital sensations. For a further treatment of the subject see the entries Sexual hallucination, Tactile hallucination, Somatic hallucination, and Nitrous oxide hallucination.

### References

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### Genuine Hallucination

Also referred to as \*true hallucination, \*veridical hallucination, and hallucination proper. The term genuine hallucination is indebted to the Latin adjective *genuinus*, which means innate. All four terms are used to denote a \*sensory deception that fulfils all the formal criteria of a hallucination. They are used in opposition to the term \*false hallucination, which can be used to designate phenomena such as \*daydreams, \*hypnagogic hallucinations, and \*physiological illusions.

### Reference

- Jaspers, K. (1997). *General psychopathology*. Volume 1. Translated by Hoenig, J., Hamilton, M.W. Baltimore, MA: Johns Hopkins University Press.

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### Geometrical Hallucination

see Geometric hallucination.

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### Geometrical Spectrum

see Fortification spectrum.



## Geometric Hallucination

Also known as geometrical hallucination, geometric visual hallucination, and optogeometric illusion. All four terms can be traced to the Greek noun *geōmetria*, which means land surveying. They are used to denote a \*formed visual hallucination characterized by lines, planes, \*spirals, and/or other geometrical forms or patterns. Some examples of geometric hallucinations are circles, ellipses, \*herringbone patterns, spider webs, \*lattices, \*gratings, kaleidoscopes, mandalas, mosaics, symmetrical flower-like patterns, and \*fortifications. When they consist of irregular branching forms they are referred to as \*dendropsia. When they consist of two-dimensional geometric forms such as tiles, squares, triangles, or hexagonal forms, they are referred to as tessellated hallucinations or \*tesselopsia. Attempts to arrange geometric hallucinations in accordance with their phenomenological characteristics have yielded a classification of \*form-constants devised by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979), and a classification of \*dimensions of visual imagery devised by the American psychopharmacologists Ronald K. Siegel and Murray E. Jarvik. As to the pathophysiological correlates of geometric hallucinations, early hypotheses tended to focus on the involvement of the retina's choriocapillary circulation or its regularly arranged rods and cones, which were thought to be rendered visible by means of a process called 'transient retrolental illumination'. Today, however, this entoptic model accounts for the mediation of no more than a fraction of the geometric hallucinations. As already noted by Klüver, geometric hallucinations tend to change places in keeping with the movements of the eyes, but to maintain their position relative to each other, suggesting that they are not mediated by the eye itself, but by the brain. As a consequence, the entoptic model of geometric hallucinations has now been largely abandoned in favour of a central model which attributes the mediation of the geometric patterns to neuronal discharges affecting the retinocortical map (i.e. the patterns of connection between the retina and striate cortex), and/or neuronal circuits lying within striate cortex. Etiologically, geometric hallucinations are associated with a variety of neurological disorders (notably \*aurae

occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy), \*psychosis, and intoxication with substances such as cannabis, LSD, mescaline, alkaloids, antihistamines, nicotine, amphetamines, carbon dioxide, nitrous oxide, and numerous therapeutics and anaesthetics. They also occur regularly in the context of \*hypnagogic and (to a lesser extent) \*hypnopompic imagery. Moreover, some of the phenomena in the category geometric hallucination can be evoked experimentally by exerting bilateral pressure on the eye bulbs (resulting in so-called \*pressure phosphenes), through the use of a flickering light (resulting in \*photically induced hallucinations) or a weak electrical current applied to the eyeball or the visual cortex (as in cortical probing), and with the aid of transcranial magnetic stimulation (TMS) of the visual cortex. It has been suggested that geometric hallucinations share certain mechanisms for the activation of visual representation with those involved in the mediation of \*mosaic vision. The term geometric hallucination derives from a classification of hallucinations governed by the theme of complexity. It is used in opposition to the terms \*simple (or \*elementary) hallucination and \*complex hallucination.

### References

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## Geometric–Optical Illusion

The term geometric–optical illusion is indebted to the Greek words *geōmetria* (land surveying) and *opsis* (seeing). It was introduced in or shortly

before 1854 by the German physicist Johann Joseph Oppel (1815–1894) to denote a \*visual illusion occurring specifically in association with a geometric structure or line drawing. A classic example of a geometric-optical illusion is the \*Oppel–Kundt illusion, in which a distance divided by graduated lines appears to be longer than a similar, but undivided distance. Oppel's attention was drawn to this type of illusion after he noticed certain regularly recurring flaws in his students' drawings. Some other classic examples of the geometric-optical illusion are the \*Müller–Lyer illusion, the \*Poggendorff illusion, and the \*Zöllner illusion. Many of these phenomena had been noticed – and employed intentionally – by philosophers, artists, and architects since ancient times, but it is Oppel who is commonly credited with having initiated the scientific study of these phenomena. Although the adjective optical may seem to suggest an involvement of the optics of the eye, geometric-optical illusions are commonly classified as \*cognitive illusions (i.e. illusions arising as a consequence of the workings of higher-order cognitive processes).

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### Geometric Visual Hallucination

see Geometric hallucination.

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### Geometrizing Illusion

see Mosaic vision.

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### Geyser Bow

see Rainbow.

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### Ghosting

see Polyopia.

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### Giant Cell Arteritis (GCA) and Hallucinations

see Temporal arteritis and hallucinations.

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### Glissando Illusion

see Musical illusion.

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### Glory

see Ulloa's bow.

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### Glue Sniffing and Hallucinations

see Toluene-induced hallucination.

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### Goblet Figure

see Rubin's figure.

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### God Helmet

see Koren helmet.

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### Gogh, Vincent Van

see Van Gogh, Vincent.

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## Grand Illusion Argument

The term grand illusion argument refers to a form of philosophical scepticism that questions the nature of our perceptual experience. It is distinguished from the classical scepticism of philosophers such as Pyrrho of Elis (c. 360–c. 270 BC) and Sextus Empiricus (c. AD 160–210), which challenges our belief in the existence of the world as such. Proponents of the grand illusion argument or ‘new scepticism’ hold that our beliefs about the nature of our perceptual experience are fundamentally wrong, in the sense that we believe it to be rich, detailed, continuous, and more or less complete, whereas empirical studies demonstrate that it is limited, discontinuous, non-uniform, and fragmented. The grand illusion argument was developed on the basis of late-20th-century work in psychology and philosophy of mind on phenomena such as \*change blindness, \*inattentional blindness, \*repetition blindness, \*inattentional deafness, \*auditory deafness, \*tactile insensitivity, and the ‘filling in’ of the \*blind spot.

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## Grapheme-Colour Synaesthesia

A term used to denote a type of \*synaesthesia in which letters or numbers are perceived as inherently coloured. Thus the A can be experienced as red, the B as green, the C as magenta, and so on. Intraindividually the associations between graphemes and colours tend to remain constant over time; interindividual constancies have never been described. The German Egyptologist Karl Lepsius (1810–1884) reportedly employed grapheme-colour synaesthetics as a guide in his philological inquiries. A woman described by the British scientist Sir Francis Galton (1822–1911) used hers to facilitate reading. Grapheme-colour synaesthetics can also be classified as a type of \*synaesthetic configuration. They should not be confused with \*number-forms.

Pathophysiologically, the mediation of grapheme-colour synaesthetics is associated primarily with \*cross-activation between regions of the parietal lobe involved in numerical cognition and spatial cognition. For other pathophysiological hypotheses, see the entry Synaesthesia.

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## Graphic Hallucination

see Visual verbal hallucination.

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## Graphic Speech Hallucination

see Visual verbal hallucination.

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## Grating

see Chessboard design.

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## Grey Hemianopia

see Hemianopia.

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## Grief Hallucination

see Bereavement hallucination.

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## Guillain–Barré Syndrome (GBS) and Hallucinations

GBS is known under more than 20 names, including Guillain–Barré–Strohl syndrome, Landry–Guillain–Barré syndrome, Landry’s paralysis,

Landry's ascending paralysis, Landry's syndrome, Kussmaul–Landry syndrome, Landry–Kussmaul syndrome, acute plexitis, acute inflammatory demyelinating polyneuropathy, acute idiopathic polyradiculoneuritis, acute idiopathic polyneuritis, acute postinfective polyradiculoneuropathy, and French polio. The eponym Guillain–Barré syndrome was introduced in 1927 by the French neurologists H. Draganesco and J. Claudion. It refers to the French neurologists Georges Charles Guillain (1876–1961) and Jean Alexandre Barré (1880–1967) who in 1916, in collaboration with the French physiologist André Strohl (1887–1977), provided the first full description of the concomitant syndrome and its cerebrospinal fluid (CSF) peculiarities. The condition itself had been described as early as 1828 by the French pathologist Auguste François Chomel (1788–1858). Today the eponym Guillain–Barré syndrome refers to a polyradiculoneuritis with an unknown cause and an auto-immune-mediated pathophysiology which results in an ascending type of sensory and motor impairment with areflexia. In accordance with clinical and electrodiagnostic criteria, various classifications of GBS have been devised. GBS may be complicated by autonomic dysfunction, aspiration pneumonia, and respiratory failure. As a consequence, the affected individual may have to undergo \*antibiotic treatment and/or invasive ventilation. Although GBS expresses itself basically as a disorder of the peripheral nervous system, CNS complications are not uncommon. These include hyponatraemia due to abnormal antidiuretic hormone secretion, REM sleep motor behaviour disorders, excessive daytime sleepiness, and abnormally low levels of hypothalamic neuropeptides such as CSF hypocretin-1. A group headed by the French neurologist Isabelle Arnulf, who studied 139 hospitalized individuals with GBS, report that more than 30% of the affected individuals display psychiatric symptoms such as anxiety, depression, \*delirium, and \*psychosis. Among these individuals, 19% report \*nightmares and other vivid \*dreams, 30% \*illusions, and 60% hallucinations. The illusions tend to consist of visual, auditory, and tactile phenomena, as well as \*metamorphopsias, \*body schema illusions, \*environmental tilt, and a \*kinaesthetic illusion of 'floating' weightlessly. Among the hallucinations reported are \*complex visual hallucinations (including \*personifications, \*zoopsia, and \*lilliputian hallucinations), and \*tactile hallucinations. As these hallucinations occur mostly

upon closing of the eyes, and tend to linger on for a while after the eyes have been reopened, these may perhaps be regarded as \*hypnagogic and \*hypnopompic hallucinations. Pathophysiologically, the mechanisms underlying the illusions and hallucinations in GBS would seem to be non-specific. General risk factors such as stress due to immobilization, as well as the use of therapeutics such as \*morphine and \*antibiotics may well play a role in their mediation. Additional risk factors suggested by Arnulf's group include sleep disturbances, autonomic dysfunction, assisted ventilation, relatively high CSF protein levels, and low CSF hypocretin-1 levels.

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### Gulliverian Hallucination

Also known as \*brobdingnagian hallucination. Both terms denote a \*macroptic hallucination depicting one or more disproportionately large human figures, either in isolation or embedded in an environment of regular proportions. The gulliverian hallucination constitutes the conceptual and phenomenological counterpart of the \*lilliputian hallucination. All the above terms are inspired by the novel *Gulliver's Travels*, written by the Irish poet and author Jonathan Swift (1667–1745). It is known that Swift suffered from symptoms reminiscent of Ménière's disease, and that he experienced cognitive changes, memory impair-

ment, personality alterations, language disorder, and facial paralysis during the last 3 years of his life. It has been speculated that the miniature and giant figures featuring in *Gulliver's Travels* were inspired by \*visual hallucinations experienced by Swift himself. According to the French psychiatrist Henri Ey (1900–1977), gulliverian hallucinations differ from lilliputian ones not only because of their perceived size, but also because of the affective tone they evoke. Ey depicts gulliverian hallucinations as depressing or downright frightening images, which are often executed in sombre colours such as grey and black. Although a certain association with \*peduncular hallucinosis has been suggested, the pathophysiology of gulliverian hallucinations is basically unknown.

#### References

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### Gurney, Myers, and Podmore's Definition of Hallucinations

In 1886 the paranormal researchers and founders of the Society for Psychical Research (SPR) Edmund Gurney (1847–1888), Frederic Myers (1843–1901), and Frank Podmore (1856–1910) defined hallucinations as “percepts which lack, but which can only by a distinct reflection be recognized as lacking, the objective basis which they suggest”.

#### Reference

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### Gustation Colorée

see Coloured taste.

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### Gustatism

The term gustatism comes from the Latin noun *gustus* (taste). It is used in \*synaesthesia research to denote a hallucinated taste which is triggered by a sense perception in a different sensory modality. In accordance with the sensory modality involved, gustatisms are divided into categories such as optical or light gustatism, tactile or touch gustatism, pressure gustatism, kinaesthetic or movement gustatism, and temperature gustatism. The term gustatism is used in opposition to terms such as \*phonism, \*photism, and \*olfactism.

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### Gustatory Aura

The term gustatory aura comes from the Latin noun *gustus* (taste) and the Greek noun *aura* (wind, breeze, smell). It used to denote a type of \*aura that manifests itself in the form of a \*gustatory hallucination or \*illusion. The gustatory aura has been described since ancient times. It is mentioned in combination with an \*olfactory aura, both occurring in the context of epilepsy, by the classical physician Aretaeus of Cappadocia (c. AD 150). Phenomenologically, gustatory auras can be indistinguishable from \*olfactory auras, probably because both are experienced as an aromatic sensation in the absence of an appropriate source in the external world. When gustatory auras occur in conjunction with hallucinations in any of the other sensory modalities or with alterations in the sense of familiarity, they are under certain circumstances designated as \*psychic auras. Etiologically, the gustatory aura is associated primarily with paroxysmal neurological disorders such as epilepsy and migraine. Pathophysiologically, it is associated primarily with aberrant neuronal discharges in the primary gustatory areas (which are tentatively located in the temporal and parietal lobes) or in any other central part of the gustatory system.

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## Gustatory Hallucination

Also known as gustatory phantasma and hallucination of taste. The term gustatory hallucination is indebted to the Latin noun *gustus*, which means taste. It is used to denote a taste sensation occurring in the absence of an appropriate tastant. Gustatory hallucinations tend to be enduring, unpleasant taste sensations qualified simply in terms of bitter, sour, sweet, 'disgusting', etc. However, they can also be described in more specific terms such as chloroform, charcoal, tobacco, rusty iron, blood, sperm, bile, garlic, grilled peanuts, oysters, and mussels. Reports of pleasant taste sensations are rare. Most gustatory hallucinations are experienced as bilateral sensations. Unilateral gustatory hallucinations have occasionally been reported in association with contralateral epileptic seizures. Traditionally gustatory hallucinations have been distinguished from \*taste disorders that are not classified as hallucinations, i.e. ageusia, hypogeusia, \*dysgeusia, \*hypergeusia, and taste agnosia. Pathophysiologically, the mediation of gustatory hallucinations is associated primarily with aberrant neuronal discharges in the primary gustatory areas, which are tentatively located in the temporal and/or parietal lobes. Theoretically, however, they can be mediated by any part of the taste delivery system. The anatomical correlates of this system are only partially known, but are believed to include the hippocampus, amygdala, peripheral taste nerves, and the tongue's taste cells. In the latter case it has been suggested that tonic stimulation of the taste cells may play a part in their mediation. Etiologically, the centrally mediated type of gustatory hallucination is associated primarily with \*aurae

occurring in the context of paroxysmal neurological disorders such as epilepsy and migraine. However, it has also been described in the context of psychiatric disorders such as \*psychotic disorder, mood disorder, and \*dissociation. As noted in 1911 by the Swiss psychiatrist Eugen Bleuler (1857–1939), "The schizophrenic hallucinations of taste and smell have no special characteristics. The patients taste sperm, blood, faeces, and all sorts of poison in their food. Soap is tasted in the noodles; grease in the coffee. Something dusty and something bitter in taste is blown towards them. Bad smells and poisons are forced into their mouths so that they have no other recourse than to stuff their mouths full of wool or rags, till they turn blue." Whether the neurobiological correlates of such gustatory hallucinations are equal to those in \*gustatory auras is as yet unknown. Clinical reports of gustatory hallucinations tend to be rare. And yet cross-sectional epidemiological studies indicate that more than 10% of the general, non-institutionalized population are aware of having experienced one or more gustatory hallucinations. The clinical assessment of gustatory hallucinations is notoriously difficult, due to their relative rarity, their susceptibility to suggestion, and confounding factors such as the – prior – presence of food or drink in the oral cavity, smoking, the use of therapeutics or illicit substances, local medical conditions such as rhinitis and oral candidiasis, and general medical conditions such as influenza. In addition, their assessment is complicated by the close relation between the sense of smell and the sense of taste. Gustatory hallucinations are easily confused with \*olfactory hallucinations, while in some studies they are considered inseparable, and therefore jointly referred to as \*chemosensory disorders.

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## Gustatory Illusion

Also known as taste illusion. The term gustatory illusion is indebted to the Latin noun *gustus*, which means taste. It is used to denote an aberrant taste sensation occurring in the presence of a tastant. The group of gustatory illusions comprises \*dysgeusia, \*hypergeusia, and \*parageusia. The gustatory illusion is commonly classified as a \*chemosensory disorder.

### References

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## Gustatory Phantasma

see Gustatory hallucination.

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## Gyropsia

The term gyropsia comes from the Greek words *guros* (round, circle), and *opsis* (seeing). It was employed, and possibly introduced, by the French psychiatrist Henri Ey (1900–1977) in 1973 to denote a \*metamorphopsia consisting of an illusory circular movement.

### Reference

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## **Hafgerdingar**

Also known as *hafgerdingar* effect. *Hafgerdingar* is Norse for ‘sea hedges’ or ‘sea fences’. The term denotes a circular \*physical illusion depicting a giant wave similar to those occasionally reported in Polar sea regions. The term *hafgerdingar* stems from a 13<sup>th</sup>-century manuscript called the *King’s Mirror*, which contains descriptions of Iceland, Ireland, and Greenland. For a long time it was believed that in this medieval text the term *hafgerdingar* refers to a circular tidal wave or a single rogue wave occurring at open sea, caused by a submarine earthquake or a capsizing iceberg, and actually capable of putting a ship in grave peril. However, a re-examination of the *hafgerdingar*’s original description indicates that the phenomenon in question may well have been a \*superior mirage or \*fata morgana. In the Polar region such physical illusions can appear to the observer as a huge wall of waves surrounding one’s ship, with an apparent height of 30 m or more.

### **Reference**

Lehn, W.H., Schroeder, I.I. (2003). *Hafgerdingar*: A mystery from the *King’s Mirror* explained. *Polar Record*, 39, 211–217.

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## **Hafgerdingar Effect**

see *Hafgerdingar*.

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## **Hagen’s Definition of Hallucinations**

In 1868 the German psychiatrist Friedrich Wilhelm Hagen (1814–1888) defined hallucinations as “the lively manifestation of a subjectively arising image (among which also tones, words, feelings) in addition to – and simultaneous with – true perceptions, and in equal effect with these.”

### **Reference**

Hagen, F.W. (1868). Zur Theorie der Hallucinationen. *Allgemeine Zeitschrift für Psychiatrie*, 25, 1–113.

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## **Haidinger Brushes**

see Haidinger’s brush.

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## **Haidinger’s Brush**

Also known as Haidinger brushes, Haidinger’s brushes, and Haidinger’s polarization brushes. All four eponyms refer to the Austrian physicist, geologist, and mineralogist Wilhelm Karl Ritter von Haidinger (1795–1871), who has been credited with being the first to describe the concomitant phenomenon in 1844. Haidinger’s brush is generally classified as an \*entoptic phenomenon. It consists of a yellowish horizontal



bar or bow-tie shape with fuzzy ends that can be seen against a blue sky at the antisolar point (i.e. while one is facing away from the Sun) or against any bright backdrop when one is looking through polarized sunglasses. In addition to the yellow bar, fainter bluish or purplish areas can sometimes be observed among the yellow brushes. The mediation of Haidinger's brush is not fully understood. It tends to be attributed to the working of the cones of the macular area of the eye, more specifically, to the polarization state (i.e. dichroism) of the macular pigment. However, it is commonly acknowledged that this appeal to dichroism does not provide a full explanation for the mediation of Haidinger's brush.

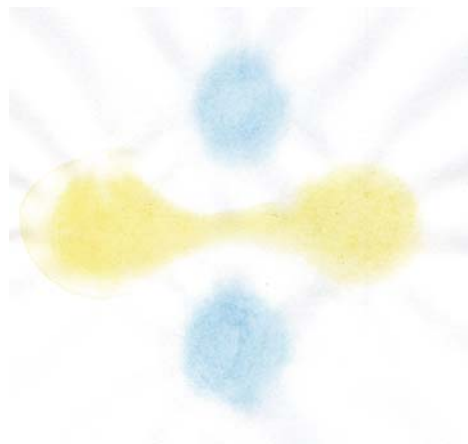
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## Haidinger's Brushes

see Haidinger's brush.



**Fig. 1** Haidinger's brushes. Illustration by JDB

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## Haidinger's Polarization Brushes

see Haidinger's brush.

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## Halitosis

see Hallucinatory halitosis.

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## Hallucinated Game

Also known as hallucinatory game. The term hallucinated game was introduced in or shortly before 1914 by the German-American psychologist and philosopher William Lewis Stern (born as Wilhelm Louis Stern, 1871–1938) to denote a child's game in which imaginary objects and scenes are actively created. Although children tend to be quite aware of the unreality of these objects and scenes, they are thought to take on a hallucinatory quality. See also the entry Imaginary companion.

### Reference

- Stern, W. (1914). *Psychologie der frühen Kindheit bis zum sechsten Lebensjahr*. Leipzig: Quelle & Meyer.

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## Hallucinated Headache

A term introduced in or shortly before 1962 by the American psychiatrist Gordon Forrer to denote a type of headache conceptually related to the \*psychogenic headache. Proceeding from the thesis that hallucinations can occur in any of the sensory modalities, Forrer argues that pain, especially in the form of a headache, can also present in a hallucinated form. In conformity with the psychoanalytic dictum that hallucinations arise as a consequence of either actual or affective hunger, he envisages hallucinated headache as a means for the affected individual "to fill what would otherwise be perceived as an intolerable psychic emptiness". In other words, Forrer suggests that the victim of hallucinated headache subconsciously 'prefers' a headache over feelings of emptiness, and thus 'creates' it to fill the intolerable void. Forrer's position on this issue has

not gone unchallenged. Apart from his appeal to the psychoanalytic theory, it is the concept of hallucinated pain that has been widely criticized. As noted by the American logician and philosopher of language Saul Kripke (b. 1940), pain constitutes the example *par excellence* of a feeling that cannot under any circumstance be designated as 'false' or 'hallucinated'. (For a further discussion of this topic see the entry Hallucinated pain syndrome.) In Forrer's defence, however, attention may be drawn to the experience of dentists and other health professionals that feelings of physical pain are not seldom expressed moments before a tooth or other body part is touched, and to the experience of hypnotists that pain can be evoked or aggravated as well as alleviated through suggestion. Forrer proposes to classify hallucinated headache as a variant of the \*somatic hallucination.

### References

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## Hallucinated Inner Speech

A notion introduced in or shortly before 1958 by the American psychiatrist and psychoanalyst Arnold H. Modell (b. 1924) to denote a \*verbal auditory hallucination (VAH) originating from endogenously generated linguistic elements. It is based on a detailed phenomenological description of the VAH experienced by 10 individuals with a clinical diagnosis of \*schizophrenia, who all heard the voices of formerly significant individuals. Modell hypothesizes that VAH experienced by such individuals "can be understood in part as reflecting those organized configurations of the mind we term internalized objects". As he continues in a psychoanalytic vein, "The concept of internalized objects is akin to what Freud described as the precipitates within the ego, those records of abandoned object relations. This implies that the voices have had some representation within the ego prior to their emergence." The notion of \*inner speech (i.e. without the adjective 'hallucinated') is borrowed from the Russian developmental psychol-

ogist Lev Semenovich Vygotsky (1896–1934). It was conceptualized by Vygotsky as speech spoken by oneself without vocalization (also referred to as verbal thought, or 'thinking in words'). The content of vygotskian inner speech typically involves an argument with oneself over a course of action to be taken, a rehearsal of what one is going to say or do, or a reassurance to comfort oneself. With the introduction of the notion of hallucinated inner speech, Modell distances himself somewhat from the vygotskian concept, in that he envisages inner speech to have a bearing not only on the ego's own verbal thoughts, but also on the verbal utterances of internalized objects. In Modell's own words, "The voices are identified as formerly loved persons, principally the parents, who in some unexplained way are fused to the self. These voice objects function as parents in terms of giving advice and being a source of prohibitions, and also in gratifying wishes stemming from all stages of infantile development." It would seem that Modell seeks to legitimize this broadened scope of the notion of inner speech by referring to a hypothetical breakdown of ego boundaries in individuals with a clinical diagnosis of schizophrenia: "With emergence of voices the ego loses its former character. The boundary separating the ego from its objects is dissolved. There is not only loss or alteration of identity, but also loss of control of certain ego functions that now are felt not to emanate from self but from the influence of the voices." It appears that it was Modell's concept of hallucinated inner speech rather than Vygotsky's original notion of inner speech which profoundly influenced the \*inner speech model of verbal auditory hallucinations which dominated neuropsychological thinking on VAH from the 1980s onwards.

### References

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- Vygotsky, L. (1986). *Thought and language*. Translation newly revised and edited by Kozulin, A. Cambridge, MA: MIT Press.

## Hallucinated Pain Syndrome

A term introduced in or shortly before 1968 by the American psychiatrist Gordon Forrer as an expansion of his concept of \*hallucinated headache. Starting from the hypothetical construct hallucinated headache, Forrer reasons that "pain can be hallucinated in any portion of the anatomy; certain headaches being but specific manifestations of more general psychosomatic phenomena." As he continues, "In expanding the concept of hallucinated pain, three diagnostic criteria defining the boundaries thereof have been established." These diagnostic criteria are (1) distribution and character of the pain (i.e. a description of pain in vague, uncertain, inappropriate or bizarre terms, or a description that violates neuroanatomical boundaries, as in cases of hysterical \*topalgia); (2) contingent circumstances (i.e. the presence of a psychological or actual state of relative emptiness such as hunger or thirst); and (3) the effects of oral activity (i.e. the improvement or disappearance of pain when the affected individual engages in oral activity such as eating or drinking). A fundamental objection against Forrer's concept of hallucinated pain stems from the argument that a subjective experience such as pain can never be imagined or 'unreal'. In philosophy this is known as the self-intimating aspect of pain experiences. As summarized by the American logician and philosopher of language Saul Kripke (b. 1940), "For a sensation to be felt as pain is for it to be pain". In Forrer's defense, however, attention may be drawn to the experience of dentists and other health professionals that feelings of physical pain are not seldom expressed moments before a tooth or other body part is touched, to the oft-reported persistence of local pain after an attack of neuralgia has subsided (referred to as hallucinated neuralgia), and to the experience of hypnotists that pain can be evoked and aggravated as well as alleviated through suggestion. Moreover, Forrer's notion deserves credit for filling a conceptual void in relation to the subjective reports of painful hallucinations of bodily sensations. As noted by the Swiss psychiatrist Eugen Bleuler (1857–1939), "Any organ can be the seat of the most severe pain. The scalp can become so sensitive that the slightest touch of the hair may produce terrible pain. Every bone in the body may ache. The patients are beaten and burnt; they are pierced by red-hot needles, daggers or spears; their arms are

being wrenched out; their heads are being bent backwards; their legs are being made smaller; their eyes are being pulled out so that in a mirror it looks like they are entirely out of their sockets; their head is being squeezed together; their bodies have become like accordions, being pulled out and then again pressed together. They have ice inside their heads; they have been put in a refrigerator. Boiling oil is felt inside their bodies; their skin is full of stones. Their eyes flicker, as do their brains. They are being plucked as one pulls horsehair out of a mattress. A cartridge ball rolls around in a spiral inside their skull from base to vertex. There is a feeling in their stomach as if the food was not retained; they feel bloated. Their lungs are stretched as if a stout man were being drawn through the body from the genitals through the abdomen into the chest. They feel heartbeats in their navels. Their heartbeat is at times slow; sometimes it is speeded up. Their respiration is hampered, their urine drawn off or blocked. Any and every organ has been removed, cut-up, torn to pieces, inverted. One testicle is swollen. The nerves, the muscles, various organs are being tightened." As summarized by Bleuler, "The hallucinations of bodily sensations present such kaleidoscopic multiplicity that no description could possibly do justice to them". It is perhaps doubtful whether the notion of a hallucinated pain syndrome does justice to painful symptoms such as those listed by Bleuler, but at least it offers a conceptual approach with conceivable practical consequences for diagnosis and treatment. Forrer proposes to classify hallucinated pain as a type of \*somatic hallucination. The notion should not be confused with \*allodynia, \*algho hallucinosis, or \*hyperalgesia, or with pain due to an unknown somatic condition.

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### Hallucinated Playmate

see Imaginary companion.

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### Hallucinated Speech

see the entries Verbal auditory hallucination and Auditory verbal hallucination.

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### Hallucinatio

see Hallucination.

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### Hallucination

Formerly known as *hallucinatio*, *allucinatio*, *alucinatio*, *\*alusia*, *\*fallacia*, *\*idolum*, and *\*phantasma*. Hallucination can be defined as a percept, experienced by a waking individual, in the absence of an appropriate stimulus from the extracorporeal world. The term *hallucination* comes from the Latin verb *\*halucinari* (also written as *\*alucinari*), which means to wander mentally or to be absent-minded. It has its root in the Greek verb *aluein*, which means to wander or to be distraught. Originally neither of these classical terms had a connotation of perceptual disturbance. The term *phantasia* was employed to designate what are today known as hallucinations and delusions. The person traditionally credited with making a conceptual distinction between hallucinations and delusions *avant la lettre* is the classical physician and rhetorician Asclepiades (124-c.40 B.C.). The term *hallucination* probably came into use during the first century AD. It entered the English language in 1572 via the translated work of the Swiss theologian Ludwig Lavater (1527–1586), and English medical jargon in 1798 through the work of the Scottish physician Alexander Crichton (1763–1846). Lavater used the term *hallucination* to connote “Ghostes and spiritus walking by nyght, and strange noyses, crackes, and sundry

forwarnynges, whiche commonly happen before the death of menne, great slaughters and alterations of Kyngdomes”. Since Lavater’s time the meaning of the term *hallucination* has varied considerably among different authors until the first half of the 19th century. It was used by the Swiss anatomist and alienist Felix Plater (1536–1614) to denote mental illness in general, whereas the French physician François Boissier de Sauvages (1706–1767) employed it as an umbrella term for perceptual errors caused by malfunctioning of the senses, comprising such diverse conditions as *\*tinnitus*, *\*diplopia*, *vertigo*, *hypochondriasis*, and *somnambulism*. The British experimentalist David Ferrier (1843–1928) used the term *hallucination* to designate deceptive impressions ranging from *\*muscae volitantes* to the most terrifying *\*phantoms*. And the above-mentioned Crichton used the term to cover both hallucinations and *\*illusions* as we know them today. Interestingly, the British physician Samuel Hibbert (1782–1848) defined hallucinations as ideas that outstrip regular sense impressions as regards their vividness. As he maintained, “Hallucinations are nothing more than ideas, or the recollected images of the mind, which have been rendered more vivid than actual impressions”. The historical watershed in the usage of the term *hallucination* stems from a contribution of the then 45-year-old French alienist Jean-Etienne Dominique Esquirol (1772–1840) to the French Dictionary of the Medical Sciences. In that work, published in 1817, Esquirol gave the following characterization of hallucinations. “A mad person who has the thorough conviction of an actually perceived sensation, while no object suited to excite that sensation is present within the range of his senses, abides in a state of hallucination. *He is a visionary*.” In 1838, after having made some adjustments to this characterization, Esquirol stated that “A person is said to labour under a hallucination, *or to be a visionary*, who has a thorough conviction of the perception of a sensation, when no external object, suited to excite this sensation, has impressed the senses.” An important reason for Esquirol to define the term in this way was his wish to have a single name at his disposal for *\*sensory deceptions* that might occur in any of the sensory modalities. As he wrote, “Hallucinations of sight... have been denominated *visions*. This name is suited to a single form of hallucination. Who would dare to say, visions of hearing, visions of taste, visions of smell? (...)

A generic term is wanting. I have proposed the term *hallucination*, as having determinate signification, and as adapted consequently, to all the varieties of delirium which suppose the presence of an object proper to excite one of the senses, although these objects may be beyond their reach." Thus Esquirol added a specific connotation to the term hallucination which has remained largely in force to the present day. However, to place this observation in the proper light it should be noted that Esquirol was not the first person in history to define hallucinations as percepts without an appropriate substratum in the external world. As pointed out by the French asylum physician Raoul Mourgue, quite similar definitions had previously been formulated by such authors as Nicolas Malebranche (1638–1715), Herman Boerhaave (1668–1738), Charles Bonnet (1720–1792), Immanuel Kant (1724–1804), and Erasmus Darwin (1731–1802). Thus it would be more appropriate to stress Esquirol's part in safeguarding the classical doctrine of hallucinations as opposed to actually formulating it. Moreover, following Esquirol's groundbreaking work the term hallucination – although given a somewhat tighter definition – continues to have multiple connotations.

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## Hallucination in Braille

The expression hallucination in Braille refers to the configurations of raised dots invented by the Frenchman Louis Braille (1809–1852) as a medium of communication for individuals with poor vision or \*blindness. The notion of hallucination in braille was introduced by the American neurologist and psychiatrist Walter Jackson Freeman (1895–1972) and his colleague Jonathan M. Williams. In 1953 they reported the case of a woman who was virtually blind and yet experienced \*visual hallucinations depicting words in braille which flashed in front of her eyes or forehead simultaneously with her own conscious thoughts. For example, when the woman thought the words *defense plant*, she would hallucinate those same words visually in braille. Reportedly, the visual hallucinations (as well as the \*auditory hallucinations from which she suffered) disappeared after a right-sided amygdaloectomy. In their paper, Freeman and Williams cite this case to support their suggestion that the amygdala plays a part in the conversion of thought processes into motor movements of the larynx (a prerequisite of ordinary speech, but also of instances of \*subvocalization) or into hallucinatory percepts occurring in one of the other sensory modalities. Although the hallucinations in braille described by Freeman and Williams can perhaps be best classified as a special case of \**Gedankenlautwerden*, it would seem equally defensible to regard them as \*visual verbal hallucinations.

### Reference

- Freeman, W., Williams, J.M. (1953). Hallucinations in braille: Effects of amygdaloectomy. *Archives of Neurology and Psychiatry*, 70, 630–634.

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## Hallucination Normale

see *Hallucination psychonome*.

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**Hallucination of Apperception**

see Apperceptive hallucination.

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**Hallucination of Memory**

see Memory hallucination.

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**Hallucination of Motion**

see Kinaesthetic hallucination.

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**Hallucination of Perception**

see Perceptive hallucination.

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**Hallucination of Physical Duality**

see Out-of-body experience (OBE or OBEE).

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**Hallucination of Presence**

see Sensed presence.

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**Hallucination of Smell**

see Olfactory hallucination.

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**Hallucination of Taste**

see Gustatory hallucination.

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**Hallucination of the Self**

see Heautoscopy.

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**Hallucination of the Senses**

see Sensory hallucination.

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**Hallucination of Touch**

see Tactile hallucination.

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**Hallucination Proper**

see Genuine hallucination.

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***Hallucination Psychonome***

Also referred to as *hallucination normale* or ‘normal hallucination’. The French term *hallucination psychonome* is indebted to the Greek words *psuchè* (life breath, spirit, soul, mind), and *nomos* (law). It translates loosely as ‘hallucination in accordance with the mind’s laws’. It was introduced in or shortly before 1930 by the French psychiatrist Pierre Quercy to denote a hallucination that can be evoked in any individual susceptible to suggestion. As Quercy’s compatriot Henri Ey (1900–1977) notes, the notion of *hallucination psychonome* would not seem to have a bearing on hallucinations proper, but rather on ‘illusions (more specifically, on ‘normal illusionary phenomena’).

**References**

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**Hallucination-Focused Integrative Treatment (HIT)**

The acronym HIT was coined in or shortly before 2001 by the Dutch psychiatrist Jack A. Jenner to denote an integrated medical treatment programme designed for individuals who suffer from hallucinations. The treatment programme seeks to engage the key figures in the ‘hallucinators’ lives and to demand their help in executing the treatment package, which includes an emergency plan, effective drug treatment, ‘cognitive behavioural therapy, training of coping styles, psycho-education, problem-oriented systems therapy, and rehabilitation.

**Reference**

Jenner, J.A., Nienhuis, F.J., van de Willige, G., Wiersma, D. (2004). Hallucinations focused integrative treatment improves burden, control, and symptoms in schizophrenia patients with drug-resistant hallucinations. *Schizophrenia Bulletin*, 30, 127–139.

**Hallucinator**

A term used in empirical research settings to denote an individual who is currently hallucinating. In these settings the term hallucinator is used in opposition to the terms \*trait hallucinator and \*trait-positive hallucinator, both used to denote an individual with a history of hallucinatory activity who is currently not hallucinating, as well as to the terms \*trait-negative hallucinator and non-hallucinator, used to denote an individual who has no history of hallucinatory experience.

**Reference**

Woodruff, P.W., Wright, I.C., Bullmore, E.T., Brammer, M., Howard, R.J., Williams, S.C., Shapleske, J., Rossell, S., David, A.S., McGuire, P.K., Murray, R.M. (1997). Hallucinations and the temporal cortical response to speech in schizophrenia: A functional magnetic resonance imaging study. *American Journal of Psychiatry*, 154, 1676–1682.

**Hallucinatory Confusion**

A term introduced in or shortly before 1894 by the Austrian founder of psychoanalysis Sigmund Freud (1856–1939) to denote a variant of the so-called defence neuro-psychosis in which an unbearable idea becomes detached from the ego and is subsequently averted through a flight into \*hallucinos. Freud gives the example of a young woman whose rejection by a man with whom she had fallen in love, and with whom she was nevertheless frequently confronted, turned from denial of the situation into the delusional conviction that the man would yet come to return her affection, and finally into her hearing the man's hallucinated voice. As Freud asserts, "The fact to which I now wish to call attention is that the content of such an hallucinatory psychosis

consists precisely in the accentuation of the very idea which was first threatened by the experience occasioning the outbreak of the illness. One is therefore justified in saying that the ego has averted the unbearable idea by a flight into psychosis." Hallucinatory confusion can be classified as a type of \*psychogenic hallucination. Conceptually, it is related to the notion of \*conversive hallucination.

**Reference**

Freud, S. (1894). *The defence neuro-psychoses*. In: *Sigmund Freud. Collected papers. Volume I.* (1959). Translated by Rickman, J. Edited by Jones, E. New York, NY: Basic Books.

**Hallucinatory Diplopia**

see Diplopia monocularis.

**Hallucinatory Disposition**

Also known as \*hallucinatory state and hallucinatory predisposition. The French term *disposition hallucinative* is indebted to the Latin noun *dispositio*, which means arrangement or natural tendency. It was employed, and possibly introduced, by the French physician Pierre Dheur to denote an individual's ability or propensity to hallucinate. As Dheur argues, one's hallucinatory disposition is a given, involuntary property, whereas hallucinations themselves may in some cases be summoned up voluntarily (hence his use of the term \*voluntary hallucination).

**Reference**

Dheur, P. (1899). *Les hallucinations volontaires (l'état hallucinatoire). Suivi d'un chapitre sur les hallucinations. Notes manuscrites et inédites du Dr. J. Moreau (de Tours)*. Paris: Société d'Éditions Scientifiques.

**Hallucinatory Epilepsy**

A term used to denote a focal type of epilepsy presenting in the form of a brief, paroxysmal, stereotyped, and irresistible hallucinatory state.

This state tends to take the form of a \*complex or \*compound hallucination lasting some 10–30s and recurring at indefinite intervals, each episode constituting either an exact replica of or – in the case of a progressive lesion – a variation on the previous one (known as a \*stable hallucination). Additional symptoms of hallucinatory epilepsy include \*somatosensory hallucinations such as sweating, blushing, borborygmi, and abdominal discomfort. In conformity with the late 19<sup>th</sup>-century concept of uncinat epilepsy, oral and/or nasal activity can occur as well (including sniffing, smelling, and smacking of the lips). In some cases, each hallucinatory episode is followed by a transient partial impairment of cerebral function or even a tonic-clonic seizure. In the case of multiple epileptic foci, different attacks may occur, but again each individual attack is presumed to be stereotypical in nature. Today the concept of hallucinatory epilepsy has been assimilated by the major category of \*aura as defined by the International League Against Epilepsy (ILAE). This category should not be confused with the classic notion of aura (in the sense of a prelude to an epileptic seizure or a migraine attack). For a comparison of the two connotations, see the entries Epilepsy and hallucinations, and Aura.

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### Hallucinatory Flicker-Induced Experience

see Photically induced hallucination.

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### Hallucinatory Form-Constants

see Form-constants.

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### Hallucinatory Game

see Hallucinated game.

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### Hallucinatory Halitosis

Also designated as delusional halitosis and imaginary halitosis. All three terms are indebted to the Latin noun *halitus* (breath), and the word ending *-osis* (disease, condition). The term hallucinatory halitosis is used to denote a perceived halitosis (i.e. oral malodour or foetor oris) that is based on \*olfactory or \*gustatory hallucinations. When the affected individual merely imagines having a foul breath, without actually experiencing \*cacosmia or \*cacogeusia, the terms delusional halitosis and imaginary halitosis would appear more appropriate. In the literature, however, all three terms tend to be used as if they were synonyms. When the affected individual believes that the foul odour emanates from his or her own body, the term \*intrinsic olfactory hallucination applies. The term \*olfactory reference syndrome is used when there is no insight into the hallucinatory nature of the foul odour or when the affected individual develops delusions of reference on the basis of this symptom, to the extent that he believes persons in his environment are showing subtle signs of aversion or disgust. Pathophysiologically, hallucinatory halitosis is associated primarily with aberrant neurophysiological activity in the uncinat gyrus of the temporal lobe. Etiologically, it is associated primarily with focal epileptic seizures.

#### Reference

Iwu, C.O., Akpata, O. (1989). Delusional halitosis. Review of the literature and analysis of 32 cases. *British Dental Journal*, 167, 294–296.

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### Hallucinatory Insanity

see Paranoia hallucinatoria.

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### Hallucinatory Madness

The German term *hallucinatorisches Irresein*, or hallucinatory madness, was introduced in or shortly before 1878 by the German psychiatrist Hermann Emminghaus (1845–1904) to denote a



mental disorder dominated by hallucinations and \*illusions (or \*phantasms, as Emminghaus refers to these two classes of phenomena). In Emminghaus's own words, "Hallucinatory madness is understood as a mental disturbance in which phantasms are often, if not continuously, present, and in several or all of the sensory modalities." It would seem that hallucinatory madness as envisaged by Emminghaus is characterized by long-lasting \*compound and \*scenic hallucinations.

#### Reference

Emminghaus, H. (1878). *Allgemeine Psychopathologie, zur Einführung in das Studium der Geistesstörungen*. Leipzig: F.C.W. Vogel.

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### Hallucinatory Memory

see Memory hallucination.

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### Hallucinatory Near-Death Experience

see Afterlife-related hallucination.

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### Hallucinatory Neologism

A term used to denote a newly formed word which presents itself in the form of hallucinatory content, usually as a \*verbal auditory hallucination (VAH) or \*verbal hallucination. The German psychiatrist and philosopher Karl Jaspers (1883–1969) mentions the case of Daniel Paul Schreber (1842–1911), a German judge who was hospitalized on various occasions because of severe psychotic episodes and who maintained that he heard the "basic language of his rays" in the form of strange and alien words. As Jaspers recounts, "He always emphasized that until he heard the words they had been quite unknown to him." Occasionally, auditory hallucinations may present in a language not spoken by the affected individual. However, it is generally assumed that such hallucinations in an actual foreign language can only arise when the affected individual has at least been passively exposed to that language.

#### References

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### Hallucinatory Obsession

The French term *obsession hallucinatoire*, or hallucinatory obsession, was introduced in or shortly before 1895 by the French psychiatrist Louis Jules Ernest Ségla (1856–1939) to denote a hallucination which develops from an obsession. The term is used by Ségla in opposition to the term *hallucination obsédante* (i.e. \*obsessional hallucination), which he reserves for a \*hallucination proper which is accompanied by all the symptoms characteristic of an obsession, including anxiety, distress, and discomfort. As Ségla maintains, in obsessional individuals hallucinations "can be primary (*primitive*) or secondary: the former or 'obsessional hallucination' (*hallucination obsédante*) is an independent hallucination – verbal, auditory, visual, or motor – that is experienced by the patient in an obsessional way, e.g. as in onomatomania; the latter or hallucinatory obsession (*obsession hallucinatoire*) consists of a hallucination that has developed out of an obsession." The notions of hallucinatory obsession and obsessional hallucination should not be confused with the notion of \*compulsive hallucination, which has a related, but slightly different meaning.

#### References

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## Hallucinatory Polyopia

The term hallucinatory polyopia is indebted to the Greek words *polus* (much, many) and *opsis* (seeing). It was introduced in or shortly before 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to designate a type of \*polyopia characterized by the perception of multiple identical hallucinatory images. Klüver uses the term hallucinatory polyopia in opposition to \*‘objective’ polyopia and \*imaginal polyopia.

### Reference

Klüver, H. (1966). *Mescal and Mechanisms of hallucinations*. Chicago, IL: University of Chicago Press.

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## Hallucinatory Predisposition

see Hallucinatory disposition.

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## Hallucinatory State

A term that tends to be used quite loosely to indicate the presence of hallucinatory phenomena, irrespective of the context in which they occur. The French term *état hallucinatoire* was used – and possibly introduced – in 1845 by the French psychiatrist Jacques-Joseph Moreau de Tours (1804–1884) to express the conceptual and phenomenological analogies which he discerned between \*hashish hallucinations and the \*dream state. The term *état hallucinatoire* has also been used to denote a person’s \*hallucinatory disposition, i.e. an individual’s ability or propensity to hallucinate. As the French physician Pierre Dheur wrote in 1899, “Hallucinations are the resultant of a normal mechanism, functioning under peculiar circumstances, that we designate as the hallucinatory state.” Dheur distinguishes four main factors that would seem to determine a person’s hallucinatory state, comprising intoxications, transient pathological states such as congestion or fever, chronic pathological states such as neurological or psychiatric illnesses, and idiopathic (i.e. in “persons who are called healthy of mind”). In addition to the group of

\*hallucinations proper, Dheur distinguishes four types of phenomena attributable to the hallucinatory state, comprising pathological dreams, \*hypnagogic hallucinations, \*psychic hallucinations, and \*illusions. He conceptualizes these phenomena as lying on a continuum with hallucinations proper.

### References

Dheur, P. (1899). *Les hallucinations volontaires (l'état hallucinatoire). Suivi d'un chapitre sur les hallucinations. Notes manuscrites et inédites du Dr. J. Moreau (de Tours)*. Paris: Société d'Éditions Scientifiques.

Moreau, J.-J. (1845). *Du hachisch et de l'aliénation mentale. Études psychologiques*. Paris: Fortin Masson.

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## Hallucinatory Suggestion

A term used in the literature on hypnotism to denote a suggestive technique by means of which hallucinatory phenomena can be evoked in a susceptible person.

### Reference

Wolberg, L.R. (1948). *Medical hypnosis. Volume I. The principles of hypnotherapy*. New York, NY: Grune & Stratton.

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## Hallucinatory Twilight State

The German term *halluzinatorische Dämmerzustand* (i.e. hallucinatory twilight state) was introduced in or shortly before 1926 by the German neuropsychiatrist Karl Kleist (1879–1960) to denote a type of \*twilight state (i.e. a prolonged episode of clouded or narrowed consciousness during which the affected individual is virtually unaware of his or her surroundings), which is dominated by hallucinations and \*illusions. These hallucinations and illusions tend to display a \*panoramic character, thus replacing the extracorporeal environment as perceived through the senses. The hallucinations described in the context of the hallucinatory twilight state are predominantly \*visual and \*auditory in nature, but \*tactile and \*somatic hallucinations have been described as well. Kleist suggests a certain sim-

ilarity between the hallucinations occurring in the context of the hallucinatory twilight state and those occurring in the context of \*delirium, including the occurrence of \*zoopsia (i.e. the perception of hallucinated animals), and the co-occurrence of general confusion and disorientation. Conceptually as well as phenomenologically, the hallucinatory twilight state would seem to lie on a continuum with conditions such as \*dissociation, hysteria, fugue, \*hallucinatory epilepsy, postictal confusion, \*alcoholic hallucinosis, and delirium.

### Reference

Kleist, K. (1926). *Episodische Dämmerzustände. Ein Beitrag zur Kenntniss der konstitutionellen Geistesstörungen*. Leipzig: Georg Thieme Verlag.

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## Hallucinogen

Also known as hallucinogenic drug, hallucinogenic substance, magicum, pseudohallucinogen, illusinogen, mysticomimetic, phanerothyme, \*psychedelic, psychedelc drug, psychedelc substance, psychotic, \*psychotomimetic, \*phantasticum, and \*eideticum. The term hallucinogen comes from the Latin verb *\*alucinari* (to hallucinate) and the Greek noun *genesis* (creation, origin). It translates loosely as 'creator of hallucinations'. The term hallucinogen was introduced into the biomedical literature in 1953 by the British physician Christopher Johnson, who had in turn borrowed it from the psychiatrists Abram Hoffer (b. 1917), Humphry Fortescue Osmond (1917–2004), and John Raymond Smythies (b. 1922), who did not use the term in print until 1954. The term hallucinogen is used more or less interchangeably with the other terms listed above to denote a group of chemical substances that have the potential to alter consciousness and to evoke phenomena such as hallucinations, \*illusions, \*sensory distortions, \*delirium, loss of contact with reality, and sometimes coma and death. A classic definition of the term hallucinogen stems from the American psychiatrist Louis Jolyon West (1924–1999), who maintains that hallucinogenic drugs "may be defined as substances that create gross distortions in perception without causing loss of consciousness when administered in low doses (not toxic overdoses)." The latter designa-

tion is essential to a proper understanding of the notion of hallucinogens, since said substances are only considered 'hallucinogenic' above a certain dose, the level of which tends to vary somewhat across individuals. In addition, it should be noted that not all substances capable of evoking hallucinations are considered hallucinogens and that even psychopharmacologists do not agree on the proper delineation and classification of these substances. No doubt it is for this reason that there are so many different names, each used somewhat differently. A rather rigid classification of hallucinogens, used by the American pharmacologist and medicinal chemist David E. Nichols (b. 1944) includes only "substances with [a] psychopharmacology resembling that of the natural products mescaline and psilocybin and the semisynthetic substance known as lysergic acid diethylamide (LSD-25)." As Nichols explains, this includes only those substances which exert their CNS effects via an agonist or partial agonist action upon the serotonin receptor. The class of hallucinogens can be arranged in numerous ways. Using the criterion of psychoactive potential as a guiding principle, hallucinogens can be divided into three broad classes, referred to as psychedelics, \*dissociatives, and \*deliriants (or \*true hallucinogens). Using their chemical structure as a guiding principle, they fall into two different classes, called the tryptamines and the phenethylamines. Among the substances generally classified as hallucinogens are bufotenine, datura, LSD, mescaline, psilocin, belladonna, mandrake, henbane, atropine, and scopolamine. In addition to their potential to mediate hallucinations during the state of intoxication, hallucinogens can induce long-term perceptual complications such as \*flashbacks, \*visual snow, and \*hallucinogen-induced persistent perception disorder (HPPD). As to the mechanism of action of hallucinogens, the involvement of various neurotransmitter systems in the CNS (such as the serotonergic, glutamnergic, and dopaminergic systems) is known, but it is as yet unclear exactly how these neurotransmitter systems exert their influence upon the perceptual system, and even whether this influence constitutes the principal mechanism of action of hallucinogenic substances. Moreover, the CNS effects of hallucinogens are not entirely predictable, dependent as they are upon the expectations of the user (i.e. the 'set'), and the environment in which they are used (i.e. the 'setting'). When used in relatively high doses, hallucinogens can produce

the experience of an 'alternate reality', also referred to as a transcendental or mystical experience. Adverse reactions to hallucinogens are commonly referred to as a 'bad trip'. In 1979 the term \*entheogen was introduced as yet another alternative for the terms listed above, in an effort to reinstate the original spiritual connotations of these substances in \*mysticism and shamanism. A person intentionally employing hallucinogens for the purpose of exploring the psyche may be called a \*psychonaut. The term hallucinogen is used in opposition to the terms entactogen and empathogen, which both denote psychoactive substances capable of evoking distinctive emotional and social (as opposed to hallucinatory) effects, as in ecstasy use, for example.

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## Hallucinogen Hallucinosi

see Hallucinogen-induced psychotic disorder.

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## Hallucinogen-Induced Persistent Perception Disorder (HPPD)

Also known as hallucinogen persistent perception disorder and hallucinogen persisting perception disorder. All three names refer to a diagnostic category characterized by a recurrence or persistence of \*entoptic phenomena and/or \*visual hallucinations, reminiscent of those experienced during a prior episode of intoxication with a \*hallucinogen. The American psychopharmacologist Henry David Abraham envisages HPPD as a perseverance of visual information, or a disinhibition of visual information processing, which may result in the occurrence of \*afterimages, \*trailing phenomena, \*photopsia, and the formation of complex imagery on otherwise blank surfaces. Other symptoms of HPPD

include \*halos perceived around objects, transient \*colour vision deficiencies, \*visual snow, \*metamorphopsias, and \*muscae volitantes. Etiologically, HPPD is associated primarily with the prior use of a hallucinogen, but the syndrome has also been reported in individuals unaware of any such use. As to the pathophysiology of HPPD, quantitative EEG analyses (qEEGs) indicate that HPPD may be associated with a shortened occipital evoked potential latency. The prognosis of HPPD is variable. In some individuals the symptoms are self-limiting within a relatively short time span, while in others they may last for years. It has been suggested that in a conceptual and phenomenological sense (and perhaps a pathophysiological sense as well) HPPD is related to other mnemonic events, such as drug-related \*flashbacks, \*post-traumatic flashbacks, \*palinopsia, \*phantom pain, \*reperceptive hallucinations, \*eidetic imagery, and \*flashbulb memories.

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## Hallucinogenic Drug

see Hallucinogen.

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## Hallucinogenic Fish Poisoning

see Ichthyoallyeinotoxicism.

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## Hallucinogenic Salamander Brandy

A name used to denote a distilled alcohol with hallucinogenic properties which is made out of fruit and salamanders and is purportedly produced in the mountain regions of Slovenia. It has been suggested that hallucinogenic salamander brandy is manufactured in accordance with an ancient alchemical recipe involving the distillation of a fruit mash and the subsequent place-

ment of live European fire salamanders (*Salamandra salamandra*) into the distillation vessel. The salamanders' skins contain the steroidal alkaloids samandarin, samandaridin, and samandenon, which are thought to lend the brandy the potential to mediate such diverse perceptual effects as \*hyperaesthesia, \*visual illusions, \*metamorphopsias, \*geometric and \*complex visual hallucinations, \*auditory hallucinations, \*somatic hallucinations, and \*compound hallucinations. Because of its alleged psychoactive properties, *S. salamandra* is referred to as \*psychoactive fauna. According to the Slovenian anthropologist Miha Kozorog, the existence of a Slovenian tradition of manufacturing salamander brandy and its purported hallucinogenic effects have been exaggerated by the media. What is known is that various species of salamander contain samandarin and other steroid alkaloids and that these species have been used for varying purposes in medicine and alchemy for at least two millennia.

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or \*hypnopompic hallucinations, but which are not themselves classified as hallucinations. An example of a hallucinoid experience is \*sensed presence, i.e. the intuitive feeling (rather than perceptual impression) that someone or something is nearby. The American psychologist and philosopher William James (1842–1910) regards such phenomena as imperfectly developed hallucinations, hence the characterization 'hallucinoid'. According to the Canadian psychologist and sleep researcher James Allan Cheyne, factor-analytic studies indicate the existence of three separate clusters of hallucinoid experiences. The first cluster, referred to by Cheyne as \*intruder, includes sensed presence, \*visual, \*auditory, and \*tactile hallucinations, and feelings of anxiety. The second cluster, called \*incubus after the mythological creature that sits on the chest of the tormented sleeper, comprises pressure on the chest, breathing difficulties, pain, and associations with impending death. The third cluster (designated variously by Cheyne as \*illusory movement experiences, unusual bodily experiences, and \*vestibular-motor hallucinations) includes a sensation of flying, falling, or floating, as well as elevator feelings, spinning sensations, \*autoscopy, and \*out-of-body experience.

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## Hallucinogenic Substance

see Hallucinogen.

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## Hallucinogen Persistent Perception Disorder

see Hallucinogen-induced persistent perception disorder (HPPD).

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## Hallucinoid Experience

An umbrella term for a variety of \*sensory deceptions which may accompany \*hypnagogic

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## Hallucinosis Syndrome

A term used to denote a hallucinatory syndrome characterized by a specific type of hallucination or by an association with a specific clinical or neurobiological parameter. Hallucinosis syndromes are conceptualized along the lines of the notion of \*hallucinosis. Examples described in the literature include \*acute hallucinosis, \*chronic hallucinosis, \*alcoholic hallucinosis, \*brainstem auditory hallucinosis, \*chronic tactile hallucinosis, \*cocaine hallucinosis, \*experiential hallucinosis, \*experiential thalamic hallucinosis, \*functional hallucinosis, \*hallucinosis phantastica, \*narcotic

hallucinoses, \*organic hallucinoses, \*peduncular hallucinoses, and \*syphilitic hallucinoses.

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## Hallucinoses

A term coined in or shortly before 1900, possibly by the German neurologist Carl Wernicke (1848–1904), to denote a mental state or disorder in which hallucinations feature prominently. The term hallucinoses has been variously defined as (1) a mental state characterized by continual hallucinations, (2) an abnormal condition or mental state characterized by hallucinations, (3) a psychiatric disorder involving hallucinations, (4) a syndrome, usually of organic origin, characterized by more or less persistent hallucinations, (5) a transient \*hallucinatory state accompanied by a clear sensorium and/or proper insight into its nature, and (6) a delusional state triggered by hallucinations (as in \*hallucinoses phantastica). The French psychiatrist Henri Ey (1900–1977) follows his compatriot Henri Charles Jules Claude (1869–1946) and the German psychiatrist Paul Schröder (1873–1941) in characterizing hallucinoses as a hallucination, the false nature of which is recognized by the affected individual. Aware of the multiple connotations of the term hallucinoses, Ey proposes that it be replaced by \*hallucinotic eidolia (*éidolie hallucinosique*). Wernicke, however, uses the term hallucinoses to denote the clinical picture of \*paranoia hallucinatoria, as well as in the context of notions such as \*acute hallucinoses, \*chronic hallucinoses, and chronic hallucinoses of alcoholics (i.e. \*alcoholic hallucinoses). Some additional examples of \*hallucinotic syndromes described in the literature are \*alcohol hallucinoses, \*brainstem auditory hallucinoses, \*chronic tactile hallucinoses, \*cocaine hallucinoses, \*crepuscular hallucinoses, \*experiential hallucinoses, \*experiential thalamic hallucinoses, \*functional hallucinoses, \*hallucinoses phantastica, \*narcotic hallucinoses, \*organic hallucinoses, \*peduncular hallucinoses, \*persistent hallucinoses, and \*syphilitic hallucinoses.

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## Hallucinoses Phantastica

The term *Halluzinoses phantastica* was introduced in or shortly before 1921 by the German psychiatrist Paul Schröder (1873–1941) to denote a symptom complex of fantastic delusions rather than hallucinations. In this context the term hallucinoses would seem to refer somewhat misleadingly to the observation that the delusions in question may be based on \*bodily hallucinations (in addition to their occurrence in the context of regular bodily sensations such as hunger, a tooth ache, or palpitations). According to Schröder, hallucinoses phantastica would seem to occur primarily among elderly persons with a clinical diagnosis of paraphrenia (i.e. 'late-onset schizophrenia').

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## Hallucinotic Eidolia

The term hallucinotic eidolia is indebted to the Greek noun *eidōs*, which means image, appearance, idea. It translates loosely as 'hallucination-like image'. The French neol-

ogism *éidolie hallucinosique* was introduced in or shortly before 1973 by the French psychiatrist Henri Ey (1900–1977) to denote a hallucination with a limited duration which manifests itself in a limited part of the perceptual field, typically in the absence of pathology. An example of hallucinotic eidolia is a visual hallucination occurring in the context of \*Charles Bonnet syndrome. Given its emphasis on the benign nature of hallucinations such as these, Ey's notion of hallucinotic eidolia bears a certain similarity to the notion of \*benign hallucination as formulated by the American psychiatrist Gordon Forrer. In his *Traité des Hallucinations*, Ey proposes the term *éidolie hallucinosique* as a substitute for hallucinosis – that is to say, for the term hallucinosis as used by his compatriot Henri Charles Jules Claude (1869–1946) and the German psychiatrist Paul Schröder (1873–1941), both of whom regarded it as a hallucination occurring in the absence of pathology. Ey's desire to propose the new term *éidolie hallucinosique* stemmed from his observation that the term hallucinosis had too many different connotations and from a desire to distinguish between pathological hallucinations (which he referred to as \*hallucinations délirantes, or simply hallucinations), and phenomenologically similar percepts occurring in the absence of disease. Ey distinguishes two types of *éidolies hallucinosiques*, which he calls \*phantéidolies and \*protéidolies. He uses a related term, \*somato-éidolie, to denote what is generally known as a \*body schema illusion.

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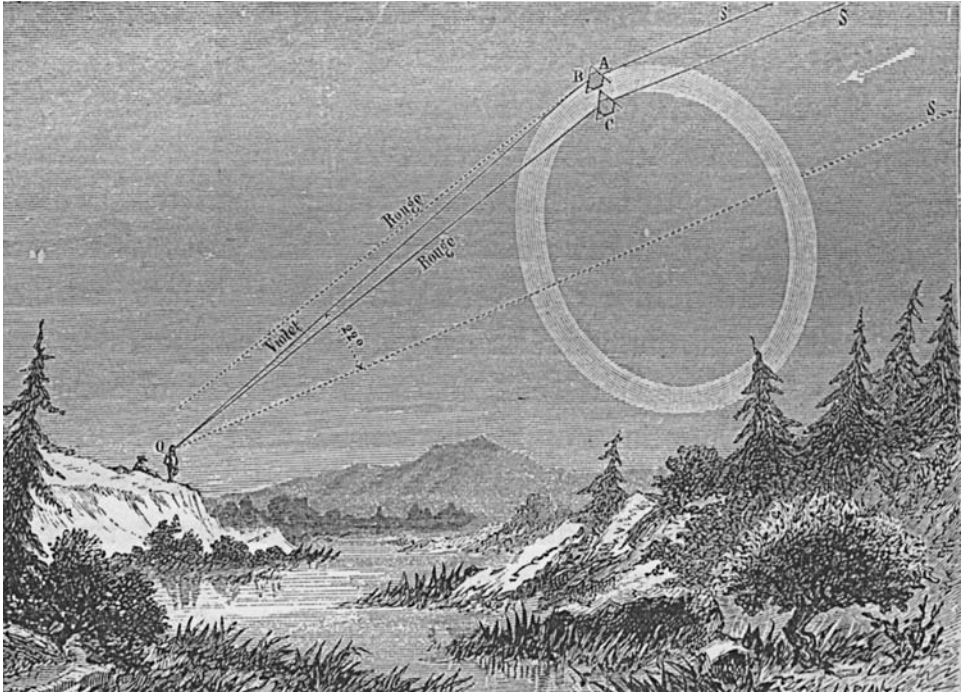
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## Halo

Also known as optical halo and corona. The term halo comes from the Greek noun *halōs*, which means area. In meteorology and physics the terms halo, optical halo, and corona are used to denote a \*physical illusion consisting of a luminous or

coloured circle, arc, spot, pillar, or cross seen in cirrus clouds and ice fogs. The best known is the circular halo surrounding heavenly bodies such as the Sun or Moon when these are viewed through a mist or thin clouds, and sometimes surrounding other light sources such as street lights, especially in foggy weather. From the middle to the periphery, the colours of circular halos are white, blue, green, yellow, and red. When multiple halos are present these colour sequences may be repeated. The term halo is used for a vast number of atmospheric phenomena. The circular halos portrayed above make up no more than a fraction of these. The French astronomer and author Nicolas Camille Flammarion (1842–1925) gives the following examples in his work *The Atmosphere* of 1872. “Under the name of *halo*. . . is designated a brilliant circle which, under certain atmospheric conditions, surrounds the Sun at a distance of 22° or 46°, while, under the name of *parhelia*, or mock suns. . . are designated luminous circular spaces, generally of a red, yellow, or greenish colour, which appear both to the right and to the left of the Sun, at the same distance (viz. about 22°), bearing a sort of rough resemblance to the Sun itself. The same appearances may be seen about the Moon; and it is, indeed, easier to observe them, as the diminished brilliancy of the Moon's light renders an examination of the area around it less difficult. These luminous spaces are called *paraselenes*. . ., or *mock moons*.” The mediation of halos around heavenly bodies is associated primarily with the refraction and reflection of light by ice crystals present in cold cirrus clouds located in the upper troposphere. The mediation of halos seen around street lights and other mundane light sources is attributed to a similar mechanism in ice fogs. The variation in the phenomenological appearance of halos is attributed to the particular shape and orientation of the crystals within ice clouds. The terms *parhelion* and *sun dog* are used interchangeably to denote an optical halo taking the shape of bright, multi-coloured patches of light on both sides of the Sun. The name \*Buddha's halo refers to a \*physical illusion sometimes seen in mountainous regions. In biomedicine, the terms halo and \*visual halo are used to denote a luminous or coloured circle mediated by the optical system itself. Etiologically, this type of halo is associated primarily with ocular conditions such as a cataract and glaucoma. As a consequence, it tends to be classified as an \*entoptic phenomenon. In the past the term halo has also been used to denote what is



**Fig. 2** Halo. Source: Flammarion, C. (1873). *The atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

currently known as a \*corona phenomenon, i.e. a \*visual illusion consisting of an extra edge around objects, which has been described in the context of \*migraine auras.

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### Halo Vision

see Visual halo.

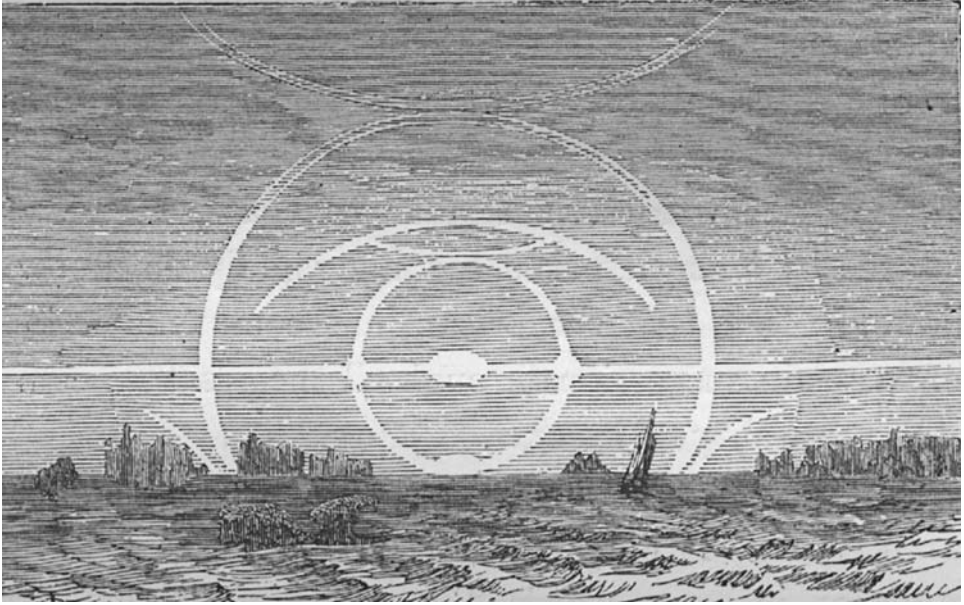
### Halucinari

Also written as \**alucinari*. The Latin verb from which the term hallucination is derived. The terms *halucinari* and *alucinari* probably came into use in the first century AD. At the time, they had the connotation of wandering mentally, being absent-minded. The terms have their root in the Greek word *aluo*, which means to wander or to be distraught.

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**Fig. 3** Halo seen in Norway. Source: Flammarion, C. (1873). *The atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

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## Haptic Hallucination

see Tactile hallucination.

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## Hare in the Moon

see Man in the Moon.

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## Hashish Hallucination

Hashish is known under many names, including hash, hasj, hasheesh, and charas. The name hashish comes from the Arabic noun *ashish*, which translates as grass, hay, or herb, and is often used as a synonym for the name cannabis. In actual fact, it refers to a preparation composed of the compressed flowers and appendages (or 'trichomes') collected from the cannabis plant. The hallucinogenic properties of hashish are attributed primarily to the concentration of

tetrahydrocannabinol (THC) present in it. This concentration varies from 2 to 8%, with an occasional peak as high as 20%. The term hash oil refers to an organic solvent used to extract THC from hashish or marihuana. The THC concentration in hash oil may range from 15 to 50%, although samples with a concentration as high as 70% have been reported. The term hashish hallucination is used to denote a variety of hallucinatory phenomena that may be elicited by the use of hashish. Like other cannabis products, hashish is usually administered through smoking. It can also be vaporized or eaten, or drunk as a tea. Hash oil is used sparingly, mostly in the form of a few drops applied to a cigarette. One of the earliest studies of hashish hallucinations is by the French psychiatrist Jacques-Joseph Moreau de Tours (1804–1884), who published a book on his own experiments with hashish in 1845. In 1857 the American journalist Fitz Hugh Ludlow (1836–1870), author of *The Hashish Eater*, proposed two 'laws of hasheesh operation' that were based on the visual imagery he himself had experienced while in a state of cannabis intoxication.

ication. In Ludlow's own words, "First, after the completion of any one fantasia has arrived, there almost invariably succeeds a shifting of the action to some other stage entirely different in its surroundings. . . . Second, after the full storm of a vision of intense sublimity has blown past the hasheesh eater, his next vision is generally of a quiet, relaxing, and recreating nature." For a further account of the hallucinogenic properties of hashish, see the entry Cannabis-induced hallucination.

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## Hat Illusion

Also referred to as hat-wearing illusion. Both terms are used to denote a \*tactile hallucination or \*illusion of a band exerting pressure around the head. It would seem that the term was introduced in 1962 by the American psychologists Harold L. Williams et al. to denote a peculiar phenomenon reported by some 20% of the participants in an experiment involving \*sleep deprivation. As Williams et al. noted, "The subjects usually labelled this 'wearing a hat,' and often were observed making repeated efforts to remove the nonexistent hat." The notion of hat illusion should not be confused with the notion of \*top hat illusion, which refers to a \*geometric-optical illusion associated with the hat of the former US president Abraham Lincoln (1809–1865).

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## Hat-Wearing Illusion

see Hat illusion.

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## Haydn, Franz Joseph (1732–1809)

An Austrian composer whose musical creativity has been attributed in part to his \*musical hallucinations. Haydn suffered from \*hearing loss, vertigo, \*tinnitus, and \*hyperacusis. As this combination of symptoms is highly suggestive of an otic lesion, it has been argued that Haydn's musical hallucinations may well have had an otological origin, possibly related with \*pulsatile tinnitus. It has also been suggested that his mental decline later in life stemmed from a subcortical vascular encephalopathy, possibly due to syphilis, and that his prior otological problems may have been manifestations of otic syphilis.

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## Hearing Loss and Hallucinations

The association between \*auditory hallucinations and severe hearing loss has been known for some time. Not unlike the \*visual hallucinations within the context of \*Charles Bonnet syndrome (CBS), auditory hallucinations against the background of hearing loss tend to make their debut several years after the onset of the sensory impairment. Empirical research indicates that the prevalence of auditory hallucinations in individuals with severe acquired hearing loss or deafness and a clinical diagnosis of \*schizophrenia is not higher than that in hearing individuals with the same psychiatric diagnosis (50 versus 50–70%). However, the auditory hallucinations experienced by individuals with severe acquired hearing loss tend to present in the form of \*compound hallucinations, comprising auditory, visual, \*tactile, and/or \*somatic components. Thus the prevalence rate of visual and \*bodily hallucinations would also seem to lie around 50% in individuals with severe acquired hearing loss or deafness, compared with around 10% in hearing individuals with a clinical

diagnosis of schizophrenia. Auditory hallucinations have also been reported by prelingually deaf individuals, but the perceptual characteristics of these 'voices' are extremely difficult to assess, and empirical research in this area is limited. At least some prelingually deaf individuals report 'voices' in the form of sign language, which can perhaps be best classified as \*visual verbal hallucinations. In individuals with hearing loss associated with \*tinnitus, the prevalence rate of auditory hallucinations is a full 100%. However, they typically experience \*nonverbal auditory hallucinations such as ringing, hissing, a clear tone, a high-tension wire, buzzing, sizzling, whistling, humming, ticking, clicking, pounding, roaring, etc. Verbal auditory hallucinations and \*musical hallucinations have been reported in association with tinnitus as well, but at much lower rates. Musical hallucinations occurring in association with moderate or severe hearing loss are sometimes referred to in the literature as the \*auditory Charles Bonnet syndrome. The pathophysiology of hallucinations in the hearing impaired is as yet poorly understood. Drawing on the literature on \*sensory deprivation, it has been suggested that auditory hallucinations may well be due to \*deafferentiation, which involves the generation of spontaneous hallucinatory activity by sensory cortical areas which are cut off from the neurons or axons conducting afferent sensory impulses. On the other hand, the sensory deprivation experiments carried out during the 1950s and 1960s have indicated that the exposure to reduced and depatterned sensory input may lead to a variety of hallucinations, but seldom to those of a verbal auditory nature. Although the books have not been closed on this issue, the pluriform pathogenesis of auditory hallucinations in general would seem to suggest an equally pluriform pathogenesis of these hallucinations in the hearing impaired. Meanwhile, the exceptionally high prevalence of compound hallucinations reported in the hearing impaired constitutes a veritable conundrum.

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## Hearing Voices Movement

The name Hearing Voices Movement refers to a philosophical trend and self-help movement for individuals with \*verbal auditory hallucinations founded during the 1980s by the Dutch psychiatrist Marius Romme (b. 1934) and the Dutch science journalist Sandra Escher (b. 1945). The movement advocates the employment of a variety of techniques developed by individuals who learned to successfully cope with their hallucinations. Key concepts to these coping strategies are acceptance of, and negotiation with, the voices.

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## Heat Allodynia

see Allodynia.

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## Heatoscopy Without Optical Image

see Sensed presence.

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## Heatoscopy

Also written as héautoscopy. Both terms stem from the Greek words *heautou* ('of oneself') and *skopeō* (I am looking at). They translate loosely as 'seeing oneself' or 'seeing [something] of oneself'. In the older literature heatoscopy is also designated as heatoscopy proper, autohallucination, hallucination of the self, and

\*dissimilar autoscopia. The German-Greek neologism *Heautoskopie* was introduced in or shortly before 1935 by the Austrian psychiatrist Erich Menninger-Lerchenthal (d. 1966) to denote an \*autoscopic phenomenon in which a hallucinated \*doppelgänger or \*double is identified as oneself, despite the lack of an exact physical resemblance to the affected individual. In Menninger-Lerchenthal's own words, "All of a sudden an individual sees himself facing himself. This manifestation looks more or less like himself, but is experienced at any rate, also when it displays certain dissimilarities with the real person, as identical with it, i.e., with one self. This scares the percipient out of his wits, and for a long time it makes a profound impression on him; he cannot ignore this manifestation. To him it is an experience. This act does not constitute a mere visual misperception. It is nothing less than a part of him that is *experienced* during a few moments." To this Menninger-Lerchenthal adds, "More important than the absolute semblance are any differences between the genuine and the hallucinated body. The latter can be significantly older or younger in appearance. It can also strike the heautoscopist as alien, even though he knows that it is he himself." To emphasize the relative unimportance of the lack of semblance with one's actual physical appearance, the French physician and psychologist Paul Auguste Sollier (1861–1933) had priorly coined the term dissimilar autoscopia to denote this phenomenon. Before Sollier, the German psychiatrist Friedrich Wilhelm Hagen (1814–1888) had referred to the same phenomenon by the term \*deuteroscopia. Heautoscopia may be accompanied by somaesthetic or vestibular sensations and feelings of derealization and depersonalization. Phenomenologically, heautoscopic doubles tend to present as diaphanous or 'ghost-like' three-dimensional bodies. In cases where more than one double is perceived, the term \*polyopic heautoscopia applies. The earliest known account of polyopic heautoscopia was published in 1826 by the German physiologist and zoologist Johannes Peter Müller (1801–1858). Where some doubles in polyopic heautoscopia are perceived as men and others as women, the term \*heterosexual heautoscopia is used. The term \*negative heautoscopia is a synonym for \*negative autoscopia (i.e. the transient failure to perceive one's own mirror image in a mirror). The term 'heautoscopia without optical image' is a synonym for \*sensed presence. Heautoscopia may occur in healthy individuals, but it

has also been described in the context of a variety of neurological and psychiatric disorders. Etiologically, it is associated with conditions such as epilepsy, migraine, brain tumour, ischaemia, and infection, but also with psychiatric disorders such as \*psychotic disorder, mood disorder, anxiety disorder, and \*dissociative disorder. Pathophysiologically, heautoscopia is associated primarily with aberrant neuronal activity in an area at the temporo-parieto-occipital junction. It is sometimes classified as a variant of the group of \*reduplicative hallucinations.

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### Heautoscopia Proper

see Heautoscopia.

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### Heiligenschein

Also known as Cellini's halo, after the Italian artist Benvenuto Cellini (1500–1571). *Heiligenschein* is German for saint's light or holy light. The term is used to denote a \*physical illusion consisting of a bright, colourless, or faintly coloured glow that can be seen around the shadow of one's head when looking at bedewed grass at the antisolar point (i.e. a point in the landscape opposite the Sun) while the Sun is at a low elevation angle. Sometimes a surface other than grassland can produce heiligenschein as well, but dewy grass is the medium best known for this effect. The mediation of heili-

genschein is attributed to the retro-reflection of sunlight by the dew drops on the grass, as well as the blades of grass themselves. A related phenomenon which occurs while viewing one's shadow cast on smooth water is called the aureole effect. Neither phenomenon should be confused with \*Buddha's light or with the \*Ulloa circle.

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## Hemeralopia

Also known as hemeralopsia and day blindness. The term hemeralopia comes from the Greek words *hēmera* (day), *alaos* (blind), and *ōps* (eye). It was introduced into the biomedical literature during the 18th century to denote an ocular condition characterized by a deterioration of vision in bright light, combined with a retention of vision in dim light and in the dark. Hemeralopia is usually classified as an \*entoptic phenomenon. Pathophysiologically, it is associated primarily with a loss or impairment of cone photoreceptor function. Etiologically, it is associated with a variety of conditions ranging from hyperaesthesia of the retina to cone dystrophy, cone dysfunction syndrome, Stargardt's disease, and retinal ischaemia. A physiological and transient form of hemeralopia may occur following the sudden transition from darkness to bright light. Conceptually, hemeralopia is the logical counterpart of \*nyctalopia or night blindness. Phenomenologically, it shows certain similarities with \*scieropia and \*scierneuropsia, two conditions which are also characterized by a deterioration of vision in bright light. In the continental European literature (notably French, German, and Italian) the term hemeralopia is sometimes used to denote night blindness instead of day blindness. To prevent conceptual confusion due to this paradoxical usage of the term, some authors prefer the term day blindness.

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literature. *British Journal of Ophthalmology*, 90,1548–1549.

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## Hemeralopsia

see Hemeralopia.

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## Hemichromatopsia

The term hemiachromatopsia comes from the Greek words *hēmi* (half), *achrōmatos* (colourless), and *opsis* (seeing). It translates roughly as 'seeing half the visual field without colour'. It refers to a variant of \*cerebral achromatopsia in which one hemifield is seen in shades of grey, while the contralateral side is seen in colour.

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## Hemianopia

Also known as hemianopsia. Both terms come from the Greek words *hēmi* (half), *an* (not), and *opsis* (seeing). They translate loosely as 'blindness in one half of the visual field'. Phenomenologically, various types of hemianopia can be distinguished. The term homonymous hemianopia refers to a variant affecting both left or both right fields of vision. Homonymous hemianopia is associated primarily with vascular or neoplastic lesions of the optical tract, optic radiation, or occipital cortex. However, it can also occur in rare cases of \*ictal blindness. The term heteronymous hemianopia is used to denote a type of hemianopia affecting either both temporal or both nasal fields of vision. Binasal hemianopia is a relatively rare condition. Pathophysiologically, both types of heteronymous hemianopia are associated with compression of the optic chiasm. Etiologically, bitemporal hemianopia can accompany a variety of conditions, such as pituitary tumours, craniopharyngeomas, and aneurysms, whereas binasal hemianopia is attributed primarily to bilateral compression of the optic chiasm by the internal carotid arteries. In addition, both forms

of heteronymous hemianopia can be caused by bilateral peripheral conditions such as retinal pathology or glaucoma. In hemianopia superior, the upper half of the visual field is amaurotic; in hemianopia inferior, the lower half. A further distinction is made between positive ('black'), negative ('grey'), and luminous ('white') hemianopia. Positive hemianopia is characterized by a black hemifield (hence the name black hemianopia), whereas negative hemianopia is characterized by an amaurotic hemifield of a more neutral hue (hence the name grey hemianopia), or the impression that the hemifield is 'missing' (known as *hémianopsie nulle* in French). The term luminous hemianopia is reserved for a type of hemianopia that can only be seen against a dark background, and which presents as a luminosity. Hemianopia can be complicated by impaired insight into the problem (as in the \*Anton-Babinski syndrome) and with \*hemianopic hallucinations. Such \*visual hallucinations are also referred to as \*ophthalmopathic hallucinations. See also the entry Charles Bonnet syndrome (CBS).

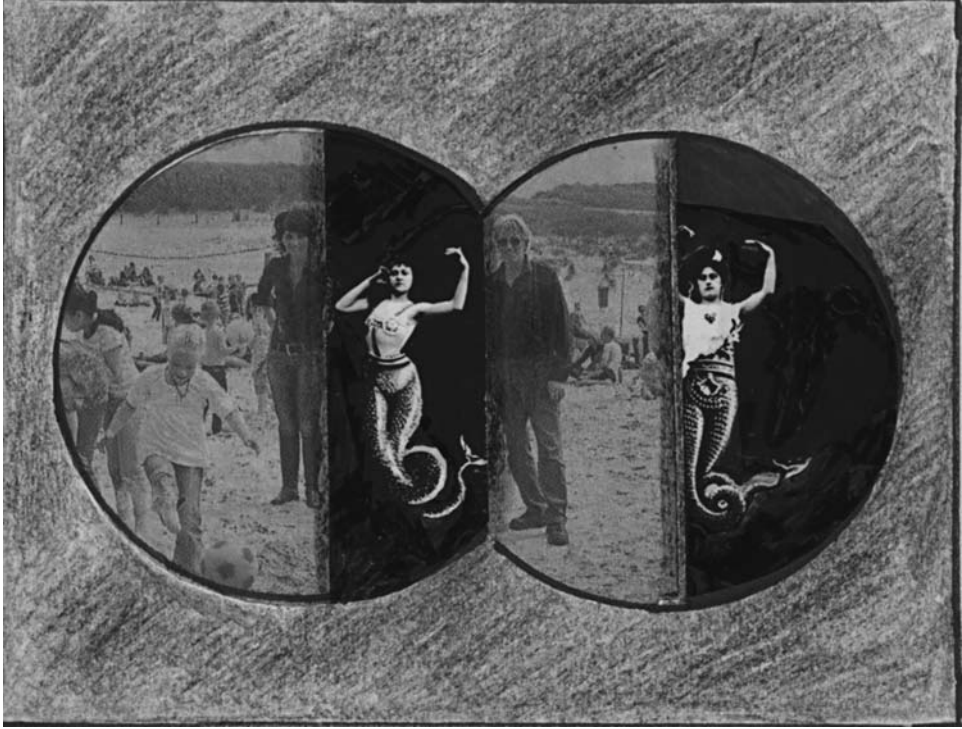
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- nation, hemioptic hallucination, and hemihallucination. The term hemianopic hallucination is indebted to the Greek words *hèmi* (half), *an* (not), and *opsis* (seeing). It translates loosely as 'a hallucination co-occurring with blindness on one side'. Hemianopic hallucinations are \*visual hallucinations occurring in individuals suffering from \*hemianopia. They typically restrict themselves to the amaurotic hemifield. Hemianopic hallucinations can be \*unformed, \*formed, or even \*complex in nature. An article published in 1886 by the French-American neurologist Édouard-Constant Séguin (1843–1898) is often referred to as the first biomedical description of hemianopic hallucinations. Although hemianopic hallucinations tend to manifest themselves in the impaired visual field, they can also present in the intact field of vision. Visual hallucinations concomitant to hemianopia have also been described as filling the whole field of vision, with or without a line of fracture at the border between the amaurotic and intact hemifields. In addition, there are a few case reports of \*autoscopy (i.e. the perception of a hallucinated \*double of oneself) occurring in the hemianopic field. The pathophysiology of hemianopic hallucinations localized in the amaurotic field of vision may be similar to that of the \*Charles Bonnet syndrome (CBS). They are traditionally regarded as \*release phenomena, i.e. as hallucinations arising from spontaneous endogenous activity in subcortical brain areas. A competing explanatory model is known as the \*deafferentiation hypothesis. However, the literature is inconclusive as to the exact pathophysiology of hemianopic hallucinations. In individual cases it is generally possible to determine the cause of hemianopia with the aid of localizing techniques such as \*EEG and \*MRI, but it is still unclear whether the existing lesions are also responsible for mediating any hallucinatory activity. Since the time of Séguin various hypotheses have been tested, focusing on the involvement of local epileptiform activity emanating from damaged brain tissue (as in \*epileptic aura), perceptual release activity, or \*reperception, and the involvement of the temporal, parietal, and occipital lobes. In a sample of 120 individuals with homonymous hemianopia or \*quadrantanopia, due mainly to lesions within the occipital lobe, the German neurologist Hans Wolfgang Kölmel found 16 cases which were complicated by \*complex visual hallucinations within the hemianopic field. On the basis of an analysis of these cases, Kölmel tentatively con-

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### Hemianopic Hallucination

Also known as hemianoptic hallucination, hemianoptic optical hallucination, hemioptic halluci-



**Fig. 4** Hemianopic hallucination. Illustration by JDB

cludes that “complex visual hallucinations in the hemianopic field may be interpreted as combined stimulation and release phenomena and differentiated from pure stimulation phenomena such as the aura of epileptic seizures as well as from pure release phenomena appearing as visual hallucinations in cases of extracerebral visual disorders.”

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- Séguin, E.C. (1886). A contribution to the pathology of hemianopsia of central origin (cortex-hemianopsia). *Journal of Nervous and Mental Disorders*, 13, 1–38.

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#### Hemianopsia

see Hemianopia.

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## Hemianoptic Hallucination

see Hemianopic hallucination.

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## Hemianoptic Optical Hallucination

see Hemianopic hallucination.

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## Hemiasomatognosia

Also known as autosomatagnosia, autosomatamnesia, hemidepersonalization, imperception for one half of the body, and negative phantoms. The term hemiasomatognosia comes from the Greek words *hèmi* (half), *a* (not), *sōma* (body), and *gnōsis* (insight). It is used to denote a unilateral type of \*acenesesthesia, characterized by a total lack of awareness of one half of one's physical body.

### Reference

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## Hemidepersonalization

see Hemiasomatognosia.

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## Hemihallucination

see Hemianopic hallucination.

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## Hemimacropsia

The term hemimacropsia comes from the Greek words *hèmi* (half), *makros* (large), and *opsis* (seeing). It translates roughly as 'seeing objects in half of the visual field as larger'. The term is used to denote a rare disorder of visual perception in which objects within one of the hemifields are perceived as larger than they are. Hemimacropsia is classified as a type of \*metamorphopsia, more specifically as a variant of \*macropsia. The term is used in opposition to \*hemimicropsia.

### Reference

Park, M.-G., Choi, K.-D., Kim, J.S., Park, K.-P., Kim, D.-S., Kim, H.-J., Jung, S. (2007). Hemimacropsia after medial temporo-occipital infarction. *Journal of Neurology, Neurosurgery and Psychiatry*, 78, 546–548.

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## Hemimetamorphopsia

The term hemimetamorphopsia comes from the Greek words *hèmi* (half), *metamorphoun* (to change the form), and *opsis* (seeing). It is used to denote a type of \*metamorphopsia (i.e. a visual distortion) characterized by a selective distortion of one half of an object or face – although in the latter case the neologism hemiprosopometamorphopsia may be more appropriate.

### Reference

Nijboer, T.C.W., Ruis, C., van der Worp, H.B., de Haan, E.H.F. (2008). The role of *Funktionsswandel* in metamorphopsia. *Journal of Neuropsychology*, 2, 287–300.

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## Hemimicropsia

The term hemimicropsia comes from the Greek words *hèmi* (half), *mikros* (small), and *opsis* (seeing). It translates roughly as 'seeing objects in one half of the visual field as smaller'. The term is used to denote a rare disorder of visual perception in which the perceived size of objects within the contralesional hemifield is reduced. Individuals who suffer from hemimicropsia tend to be fully aware of their condition. They usually report a perceived smallness and/or distortion of objects on one side, and during drawing tasks they compensate for this perceived smallness by portraying objects on that side as larger than their contralateral counterparts. Hemimicropsia tends to be attributed to lesions and/or a malfunction in specific areas within the visual association cortex. Although phenomenologically there is a certain overlap with \*hyperschematia, the two conditions differ in that hyperschematia tends to affect the left hemifield, individuals with hyperschematia are generally unaware of their condition, and the left-sided expansion in their drawings is seen as a result of neglect rather than perceptual distortion. Hemimicropsia is classified as a type of



\*metamorphopsia, more specifically as a variant of \*micropsia. The term is used in opposition to \*hemimacropsia.

#### Reference

Rode, G., Michel, C., Rossetti, Y., Boisson, D., Vallar, G. (2006). Left size distortion (hyper-schematia) after right brain damage. *Neurology*, 67, 1801–1808.

### Hemioptic Hallucination

see Hemianopic hallucination.

### Hemioptic Hallucination

see Hemianopic hallucination.

### Hemiprosopometamorphopsia

see Hemimetamorphopsia.

### Hemispatial Visual Inattention

see Visual inattention.

### Henbane and Hallucinations

Henbane is known under many names, including stinking nightshade and *Herba apollinaris*. The term comes from the Anglo-Saxon noun *hennbana*, which means killer of hens. It refers to a compound of *Hyoscyamus niger*, a plant of the Solanaceae family indigenous to Asia and Southern Europe. Henbane has been used since ancient times as an aphrodisiac, a therapeutic, an \*entheogen, an anaesthetic, and a poison. Its use for magico-religious purposes in ancient times was documented by the Roman natural philosopher Gaius Plinius Secundus, better known as Pliny the Elder (AD 23–79). The primary psychoactive constituents present in the leaves and seeds of henbane are the tropane alkaloids atropine, hyoscyamine, and hyoscyne (i.e. scopolamine). The symptoms of henbane intoxication are quite similar to those of belladonna

and atropine intoxication. They include mydriasis, blurred vision, tachycardia, vertigo, a sense of suffocation, an extremely dry throat, constipation, urinary retention, \*illusions, hallucinations, \*delirium, sopor, and eventually coma and death. These symptoms are mediated via the inhibition of the action of acetylcholine at the acetylcholine receptor in the nerve synapse, thereby blocking the physiological function of the parasympathetic nervous system. The initial effects tend to last for 3–4 h, but hallucinatory aftereffects may continue as long as 3 days. A person intentionally employing henbane for the purpose of exploring the psyche may be called a \*psychonaut. Henbane is only infrequently used for recreational purposes. It carries with it a serious risk of accidentally overdosing, but its lack of popularity as a recreational drug is due primarily to the adverse anticholinergic effects.

#### Reference

Rätsch, Chr. (2005). *The encyclopedia of psychoactive plants. Ethnopharmacology and its applications*. Translated by Baker, J.R. Rochester, VT: Park Street Press.

### Hering's Afterimage

The eponym Hering's afterimage refers to the German psychologist and physiologist Karl Ewald Konstantin Hering (1834–1918). It is used to denote a \*positive afterimage that appears first in a temporal sequence of \*afterimages resulting from a brief light stimulus. Thus Hering's afterimage has the same relative brightness relations as the primary optical stimulus. The term is used in opposition to \*Purkinje afterimage (the second in the temporal sequence of afterimages) and \*Hess afterimage (the third in this sequence). Hering's afterimage can also be classified as a \*physiological illusion.

#### Reference

Brown, J.L. (1965). *Afterimages*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: John Wiley & Sons.

### Heroin-Induced Hallucination

see Opioid-induced hallucination.

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## Herringbone

see Fortification spectrum.

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## Hess Afterimage

The eponym Hess afterimage refers to the German ophthalmologist Carl von Hess (1863–1923). It is used to denote a \*positive afterimage that appears third in a temporal sequence of \*afterimages resulting from a brief light stimulus. Hess afterimages have the same relative brightness relations as the primary optical stimulus. The term is used in opposition to \*Hering's afterimage (the first in the temporal sequence of afterimages), and \*Purkinje afterimage (the second in this sequence). The Hess afterimage can also be classified as a \*physiological illusion.

### Reference

Brown, J.L. (1965). *Afterimages*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: John Wiley & Sons.

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## Heterosexual Heautoscopy

A term used to denote a variant of \*heautoscopy in which more than one \*double or \*doppelgänger is perceived, of both sexes. In 2006 the Swiss neurologists Peter Brugger et al. reported a case of heterosexual heautoscopy in a 41-year-old man who saw two male and three female doubles who would mimic all his movements and gestures. His condition was associated etiologically with a tumour in the right insular region of the left temporal lobe.

### Reference

Brugger, P., Blanke, O., Regard, M., Bradford, D.T., Landis, Th. (2006). Polyopic heautoscopy: Case report and review of the literature. *Cortex*, 42, 666–674.

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## Heterotopagnosia

see Autotopagnosia.

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## Hibbert's Definition of Hallucinations

In 1824 the British physician Samuel Hibbert (1782–1848) defined \*apparitions (i.e. hallucinations) as follows: "Apparitions are... considered as nothing more than ideas or the recollected images of the mind, which have been rendered more vivid than actual impressions."

### Reference

Hibbert, S. (1824). *Sketches of the philosophy of apparitions; or, an attempt to trace such illusions to their physical causes*. Edinburgh: Oliver & Boyd, and G. & W.B. Whittaker.

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## Highway Inferior Mirage

see Highway mirage.

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## Highway Mirage

Also known as highway inferior mirage, asphalt mirage, hot-road mirage, and road mirage. All five terms are indebted to the French verb *se mirer*, which means to reflect or to be reflected. They are used interchangeably to denote a \*physical illusion typically depicting distant pools of water or oil or blue sky over a hot surface such as a road, a runway or a parking lot, or over hot objects such as a toaster, a heater, or the hood of a car. When they appear over a desert, the term desert mirage is traditionally used. The desert mirage should not be confused with the \*desert hallucination, which typically occurs during the night. If the light is reflected not by the sky but by a mountain or some other distant object, then that object is reflected in the mirage. The mediation of highway mirages is attributed to differences in the refractive index of the atmosphere, which are in turn attributed to differences in temperature between adjacent layers of air. Highway mirages are classified as \*inferior mirages. Like other inferior mirages, they are perceived beneath the horizon or some distant object. They are believed to stem from layers of cold air overlying layers of hot air, with differences in temperature between the adjacent layers of 10°C or more per metre. Uniform temperature gradients

tend to produce undistorted images. Increasing temperature gradients, such as those of  $10^{\circ}\text{C}/\text{m}$  near the ground, and  $20^{\circ}\text{C}/\text{m}$  higher up, tend to yield inverted images. Temperature gradients of a higher complexity may yield even more complex distortions.

#### Reference

Lynch, D.K., Livingston, W. (1995). *Color and light in nature*. Cambridge: Cambridge University Press.

### Hildegard of Bingen (1098–1179)

Also known as St. Hildegard. A German Benedictine abbess and mystic whose advanced social and theological views are based on a series of \*visions she experienced from the age of 3. On the basis of her own portrayals of these visions, one may conclude that Hildegard experienced \*elementary visual hallucinations from childhood

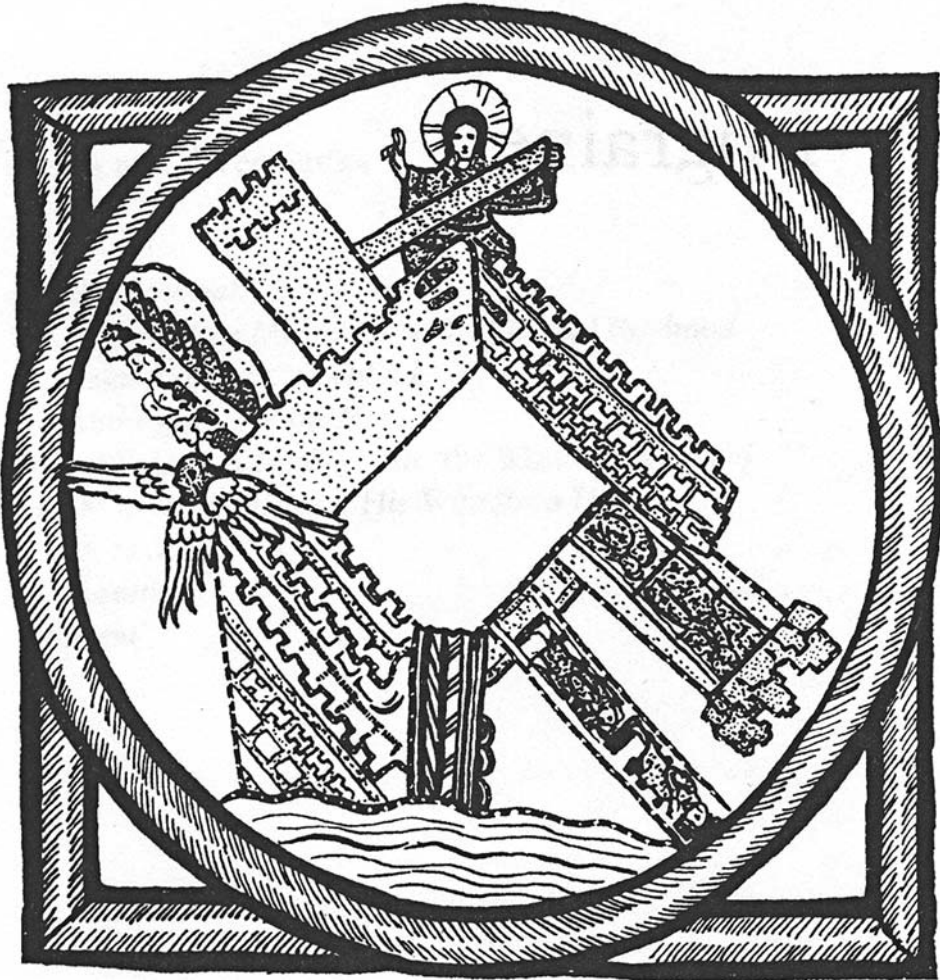
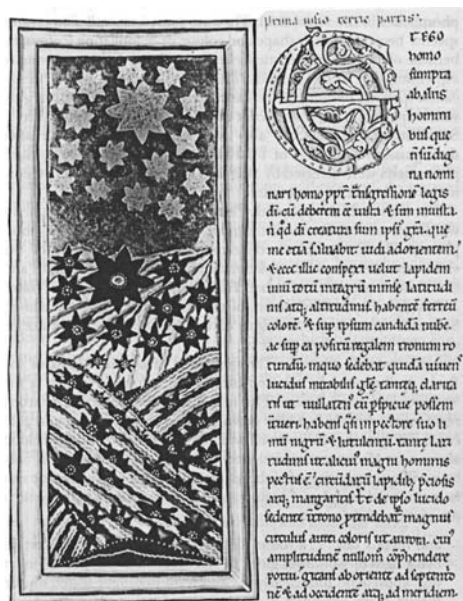


Fig. 5 Hildegard's vision of the Heavenly City (c. 1151)

onwards, in the form of “a great light of brightness”. That light was often accompanied by \*verbal auditory hallucinations (VAH) which she attributed to heavenly messengers. The simple visions were later replaced by brightly coloured \*complex visual hallucinations, depicting buildings, water imagery, landscapes, animals, people, heavenly creatures, and representations of the cosmos and the Deity. Among these were also \*compound hallucinations that took the form of \*personifications. Hildegard was very clear on her sensorium during these visions, writing, “I hear these things not with my bodily ears, nor the thoughts of my mind, nor perceive them through any combination of the five senses, but entirely within my soul, with my external eyes open, so that I never suffer a lapse into ecstasy, but I see them fully consciously by day or night.” This characterization would seem to fit in well with the formal characteristics of \*panoramic or scenic hallucinations. It is known that Hildegard’s health had always been delicate. Throughout her work positive descriptions of headaches are lacking, but it has been suggested that the crises she went through from 1141 onwards were caused by migraine attacks. In 1917 the British historian of science Charles Joseph Singer (1876–1960) was the first to attribute Hildegard’s visions to migraine. In Singer’s opinion, Hildegard’s earlier visions might well have been attributable to migraine auras without headache, and the later ones to migraine with aura. The signs and symptoms portrayed in Hildegard’s work are indeed reminiscent of what we would call \*photopsia, \*scotomata, \*amaurosis fugax, transient paresis of the limbs, and illusory alterations in the passage of time, i.e. phenomena known to occur in the context of migraine. Although less common, the complex and compound hallucinations described by her also occur in the context of migraine. However, these latter symptoms are also reminiscent of \*peduncular hallucinations. Others have suggested that Hildegard’s visions may have been caused by recurring states of temporal lobe epilepsy. The combination of seeing a bright light and hearing voices has also been interpreted as a description of \*synaesthesias. Hildegard’s canonization may be taken as confirmation of the Church’s acknowledgement that Hildegard’s visions should be interpreted as \*veritable. Hildegard has also been credited with being the first to provide a written description of the psychoactive effects of \*nutmeg in her book *Physica*.



**Fig. 6** Stars reminiscent of scintillating scotomata, by Hildegard of Bingen (c. 1151)

## References

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- Singer, C., ed. (1917). *Studies in the history and method of science. Volume 1.* Oxford: Clarendon Press.

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## Hillingar Effect

see Superior mirage.

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## HIT

see Hallucination-focused Integrative Treatment.

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## Hodological Model of Hallucinatory Activity

The term hodological model is indebted to the Greek words *hodos* (path) and *logos* (word, teaching). It was introduced in or shortly before 2005 by the British neuroscientists Dominic H. ffytche and Marco Catani as a generic name for explanatory models that attribute the mediation of hallucinations primarily to a dysfunction of the connections between specific brain regions, more specifically the connecting white-matter pathways. Some examples of hodological models of hallucinatory activity are the \*inner speech model, the \*defective corollary discharge model, and the \*reperception model. The term hodological model is used in opposition to \*topological model (which is a generic name for explanatory models that attribute the mediation of hallucinations primarily to specific brain structures). The hodological and topological models are integrated into the so-called \*hodotopic model of hallucinatory activity.

### References

- ffytche, D.H., Catani, M. (2005). Beyond localization: From hodology to function. *Philosophical Transactions of the Royal Society of London Series B Biological Sciences*, 360, 767–779.
- ffytche, D.H. (2008). The hodology of hallucinations. *Cortex*, 44, 1067–1083.

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## Hodotopic Model of Hallucinatory Activity

The term hodotopic model is indebted to the Greek words *hodos* (path) and *topos* (place). It was introduced in or shortly before 2005 by the British neuroscientists Dominic H. ffytche and Marco Catani as the name of an explanatory model that attributes the mediation of hallucinations to \*hodological as well as \*topological activity, i.e. to the aberrant activity of specific brain regions and of the white-matter connections between those brain regions. The hodotopic model is based on the notion that the perceptual system is organized as a network of connections linking multiple CNS structures, and that it is virtually impossible to single out a specific structure or CNS function as ‘the’ source of hallucinatory

activity. And yet the model assumes that specific structures can be earmarked as being of primary interest for the mediation of certain types of hallucination, and that activity increases affecting those regions (i.e. topological activity increases) may be accompanied by complex and dynamic hodological changes (i.e. changes in the connecting white-matter tracts). According to ffytche, the hodotopic framework may be considered an elaboration of the disconnection paradigm as proposed by the American behavioural neurologist Norman Geschwind (1926–1984).

### References

- ffytche, D.H., Catani, M. (2005). Beyond localization: From hodology to function. *Philosophical Transactions of the Royal Society of London Series B Biological Sciences*, 360, 767–779.
- ffytche, D.H. (2008). The hodology of hallucinations. *Cortex*, 44, 1067–1083.

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## Hoffmann–Tinel Sign

see Tinel–Hoffmann sign.

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## Hoigné Syndrome

Also known as Hoigné’s syndrome, Hoigne syndrome, Hoigne’s syndrome, penicillin psychosis, and acute psychotic syndrome after penicillin. The eponym Hoigné syndrome refers to the Swiss physician Rolf Hoigné (1903–2004), who in 1959, together with his colleague K. Schoch, described an acute psychotic state following the administration of procaine penicillin. The Hoigné syndrome is characterized by a group of neuropsychiatric symptoms following the administration of penicillin. Most case reports involve reactions to intravenously or intramuscularly administered penicillin, but the syndrome has also been described in individuals on oral medication. The symptoms of Hoigné syndrome include psychomotor agitation, panic-like anxiety, fear of death, alterations of consciousness, seizures, confusion, feelings of disintegration, depersonalization or derealization, \*body schema illusions, and hallucinations. As in other types of \*psychosis due to the administration of \*antibiotics, the hallucinations in Hoigné syndrome tend to be \*visual and \*auditory in nature. However,

\*olfactory, \*gustatory, and \*somatosensory hallucinations have been described as well. The neuropsychiatric symptoms of Hoigné syndrome tend to be accompanied by systemic symptoms such as tachycardia, hypertension, dyspnoea, and numbness or \*anaesthesia of the extremities. They typically arise within a few seconds after the injection of procaine penicillin. Pathophysiologically, the syndrome was originally attributed by Hoigné and Schoch to the microembolization of small vessels in the lungs and brain by the microcrystals of procaine penicillin. Today it is associated primarily with a pseudoanaphylactic or pseudoallergic reaction to penicillin. The neuropsychiatric symptoms are interpreted as an indication that the temporolimbic structures of the brain may be involved in this reaction. It has also been suggested that the susceptibility to the neuropsychiatric symptoms of Hoigné syndrome may be promoted by limbic system sensitization (i.e. 'kindling') in individuals repeatedly exposed to procaine.

#### References

- Araszkievicz, A., Rybakowski, J.K. (1996/1997). Hoigne's syndrome, kindling, and panic disorder. *Depression and Anxiety*, 4, 139–143.
- Hoigné, R., Schoch, K. (1959). Anaphylaktischer Schock und akute nichtallergische Reaktionen nach Procain-Penicillin. *Schweizerische medizinische Wochenschrift*, 89, 1350–1356.
- Rao, R., House, Th.G. (1999). Penicillin psychosis in later life: Hoigne's syndrome revisited. *Journal of Neuropsychiatry and Clinical Neuroscience*, 11, 517–518.

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### Hole-in-the-Hand

see Illusion of the pierced hand.

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### Holocampine Hallucination

see Panoramic hallucination.

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### Homochromatic Afterimage

The term homochromatic afterimage is indebted to the Greek words *homos* (similar) and *chrōma* (colour). It is used to denote a type of \*afterimage in which the distribution of hues is the same as

that of the original stimulation field. The term is used in opposition to the term \*complementary afterimage (which denotes an afterimage in which the hues are approximately the complements of those in the original stimulating field).

#### Reference

- Brown, J.L. (1965). *Afterimages*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: John Wiley & Sons.

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### Honeycomb

see Chessboard design.

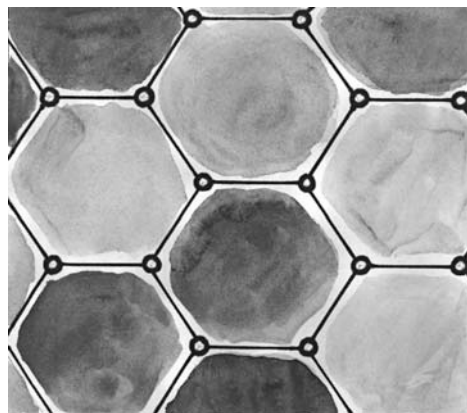


Fig. 7 Honeycomb. Illustration by JDB

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### Hoppe's Definition of Hallucinations

In 1871 the Swiss physiologist Johann Ignaz Hoppe (1811–1891) defined hallucinations as follows: "Visions and hallucinations are... not false interpretations of something on hand, but mere *constructions of something-not-on-hand* from, and out of, something on hand (either out of something palpably on hand, or out of something subjectively on hand, due to nervous excitation)."

#### Reference

- Hoppe, J. (1871). *Hallucinationen und Illusionen. Begriffserklärung und Wesen. Ein Beitrag zur Erkenntnistheorie. Auf Grund von Untersuchungen*. Basel: H. Amberger.

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## Horizon Illusion

see Moon illusion.

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## Horowitz's Definition of Hallucinations

In 1975 the American psychiatrist Mardi Jon Horowitz (b. 1934) defined hallucinations as follows: "Hallucinations are images based on immediately internal sources of information, which are appraised as if they came from immediately external sources of information."

### Reference

Horowitz, M.J. (1975). *Hallucinations: An information-processing approach*. In: *Hallucinations. Behavior, experience, and theory*. Edited by Siegel, R.K., West, L.J. New York, NY: Grune & Stratton.

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## Hostage Hallucination

Also referred to as hostage hallucinosis. Both terms are indebted to the Latin noun *hostia*, which means victim. They were introduced in or shortly before 1984 by the American psychopharmacologist Ronald K. Siegel to denote a hallucination occurring during a hostage situation. The term hostage situation is defined by Siegel as "one in which an individual is kept, usually by coercive force, by others in order to fulfil a demand or agreement". Typical hostage situations include kidnappings, sky-jackings, and terrorist actions, although Siegel also accepts claimed kidnappings by unidentified flying objects (UFOs). According to him, the earliest known account of a hostage situation with concomitant hallucinations can be found in the Bible, where the prophet Ezekiel is said to have been abducted by a round, flying, bronze-coloured object; he also saw lights, colours, and \*visions of God. In Siegel's study involving 31 victims of hostage situations, \*geometric hallucinations were the most prevalent (typically commencing a few minutes after the onset of \*sensory i.e. visual deprivation) and \*complex visual hallucinations depicting small animals (i.e. \*zoopsia), insects (i.e. \*formication), people, people's faces (i.e. \*facial hallucinations), monsters,

devils, scenes, landscapes, and childhood memories. The complex hallucinations tended to commence after several hours to several days. They were typically described as 'projections' upon a screen before the affected individual's eyes. In Siegel's study, hostage hallucinations occurred in 8 of the 31 individuals. It was suggested that their occurrence was promoted by factors such as social isolation, sensory deprivation, \*sleep deprivation, restraint on motor movements, physical abuse, and threat of death.

### References

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 Siegel, R.K. (1984). Hostage hallucinations. Visual imagery induced by isolation and life-threatening stress. *Journal of Nervous and Mental Disease*, 172, 264–272.

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## Hostage Hallucinosis

see Hostage hallucination.

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## Hot-Road Mirage

see Highway mirage.

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## Hsieh-Ping

A Taiwanese term, used to denote a \*trance-like state which is characterized by ancestor identification, tremor, disorientation, and \*delirium, which tends to last for 30 min to several hours, and which may be accompanied by \*visual and \*auditory hallucinations.

### Reference

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## Human Sonar Hypothesis of Auditory Hallucinations

The term human sonar is indebted to the acronym sonar, which stands for SOund NAVigation

Ranging. The term sonar, introduced in 1963 by the Allied Submarine Detection Investigation Committee (ASDIC), denotes the echo-sounding technique developed under the Committee's auspices for the purpose of locating underwater objects with the aid of reflected ultrasonic sound waves. A similar – biological – mechanism is utilized by various species of animals, such as the bat, marmoset, mouse, oil bird, porpoise, rat, shrew, squirrel monkey, and whale. The human sonar hypothesis, put forward in 1952 by the American neurologist and psychiatrist Walter Jackson Freeman (1895–1972) and his colleague Jonathan M. Williams, suggests that \*auditory hallucinations are mediated by a 'human sonar' system, tentatively embodied by the brain's amygdaloid nucleus. In the words of the Freeman and Williams, "We erected the hypothesis that the amygdaloid nucleus transformed the ideational activities apparently mediated by the frontal lobe into complex temporally patterned movements of the vocal musculature and that the resulting effects were heard by the patient as voices coming from outside of himself – in other words, a form of human sonar." Conceptually, this version of the human sonar hypothesis comes close to the \*subvocalization hypothesis, which suggests that \*verbal auditory hallucinations can be mediated by subvocal speech produced by the larynx. The American neuroanatomist Fred H. Johnson elaborates on this hypothesis by suggesting that the sound waves involved are of a high frequency and that these may be perceived not only by the affected individual but also by others. To quote Johnson on this issue, "The sounds produced by the person who is hallucinating are sound vibrations far above the normal. They are acoustically of high-frequency waves of the upper partials of harmonics, which are an addition to the normal sound waves of the word as it is spoken aloud. These vibrations are in the ultrasonic range at times and would be inaudible to those who do not perceive hallucinations. The energy range for this type of sound wave is estimated at 100 db to 110 db, which is the level of a boiler factory. An echo evaluation of only 1/10,000 of that produced is needed for the perception of the sound. As a hypothesis one might think of these sounds as similar to those produced by a 'dog whistle,' which is above most human hearing range. Because these sounds are high frequency and very intense, they can be heard a long way as a result of the high energy... It is theorized that such vocalizations formed the evolutionary basis

of communication." If we take Johnson's version of the human sonar hypothesis to its logical conclusion, this would apparently mean assuming that verbal auditory hallucinations may well be \*veridical hallucinations, i.e. verbal auditory percepts caused by high-frequency sounds emanating from another person's larynx.

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### Hydromancy

see Crystal vision.

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### Hygic Hallucination

Also known as hygic sensation. Both terms are indebted to the Greek noun *hugros*, which means humidity. They are used to denote a hallucination of water or other fluids, perceived in the tactile modality. Accordingly, the German psychiatrist and philosopher Karl Jaspers (1883–1969) classifies hygic hallucinations as a subclass of the \*haptic hallucination. The British neurologist Macdonald Critchley (1900–1997), by contrast, classifies them as a type of \*dysaesthesia. Hygic hallucinations may be experienced as cold, tepid, warm, or hot. They have been reported in the context of the use of \*hallucinogens such as LSD and mescaline, but also in \*aural phenomena preceding paroxysmal neurological disorders such as migraine and epilepsy. The term hygic hallucination should not be confused with the term \*waterfall illusion.

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## Hygric Sensation

see Hygric hallucination.

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## Hyperacusis

Also known as hyperacusis dolorosa, auditory hyperaesthesia, dysacusis, dysauris, loudness discomfort, loudness intolerance, over-recruitment, pseudo-recruitment, and phonophobia. The term hyperacusis comes from the Greek words *huper* (to exceed a certain boundary) and *akouein* (to hear). It translates loosely as ‘hypersensitivity to sound’. The French-Greek neologism *hypercousie* was introduced in or shortly before 1921 by the French military surgeon and otologist Jean-Marie-Gaspard Itard (1774–1838). It was later changed to the etymologically correct form *hyperacousie*. The term hyperacusis is used to denote a decreased loudness tolerance, i.e. a condition in which externally generated auditory percepts are perceived as either disproportionately loud (generalized hyperacusis with normal hearing), unpleasant (hyperacusis with recruitment), or dangerous (hyperacusis with phonophobia). However, other types and classifications of hyperacusis have also been proposed. Hyperacusis can be classified as a type of \*hyperaesthesia. A variant of hyperacusis in which intense sounds are perceived as louder than normal is called \*audiosensitivity. Pathophysiologically, hyperacusis is associated primarily with paralysis of the stapedius muscle. In some 90% of the cases there is comorbidity with \*tinnitus. Other conditions associated with hyperacusis are migraine, post-concussion syndrome, \*post-traumatic stress disorder, infantile autism, depressive disorder, Bell’s palsy, and conditions affecting either the lower motor neurone facial nerve (N. VII) or the nerve to the stapedius. The term hyperacusis is used in opposition to the term hypacusis.

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## Hyperacusis Dolorosa

see Hyperacusis.

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## Hyperaesthesia

The term hyperaesthesia comes from the Greek words *huper* (to exceed a certain boundary) and *aisthanesthai* (to notice, to perceive). It translates loosely as ‘an exaggerated type of perception’. The term is used to denote a group of conditions characterized by an increased sensitivity to sensory stimuli in any of the sensory modalities. Some examples of hyperaesthesia are \*hyperacusis, hyperaesthesia of the retina, \*hyperalgesia, \*hypergeusia, \*hyperosmia, and \*hyperpathia. The term hyperaesthesia is used in opposition to hypoaesthesia.

### Reference

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## Hyperalgesia

The term hyperalgesia comes from the Greek words *huper* (to exceed a certain boundary) and *algos* (pain). It translates loosely as ‘exaggerated pain perception’. The term is used to denote an increased sensitivity to painful stimuli. Hyperalgesia is usually classified as a type of \*hyperaesthesia. Pathophysiologically, hyperalgesia is associated primarily with the sensitization of nociceptors, due, for example, to the chronic use of morphine or other analgesics. The term hyperalgesia is used in opposition to the term hypoaesthesia. It should not be confused with \*allodynia, \*hyperpathia, and \*hallucinated pain.

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## Hyperaroused Hallucination

The term hyperaroused hallucination is indebted to the Greek words *huper* (to exceed a certain boundary) and arousal (state of alertness and readiness for action). It was probably introduced in 1969 by the American psychopharmacologist Roland Fischer to denote a hallucination that is mediated under the influence of increased sympathetic responsiveness and muscular tension, notably in the context of \*psychosis and drug-induced states. Fischer uses the term hyperaroused hallucination in opposition to the term \*hypoaroused hallucination. Both notions derive their meaning from the context of a \*release model of hallucinatory activity, which attributes the content of hallucinations to subcortical neuronal activity, and its release to either hypo- or hyperarousal. As Fischer maintains, “We may distinguish two types of hallucinatory behaviour: that which increases in intensity when one moves along the perception-hallucination continuum of ergotropic or hyperarousal and that which spiritualizes when a subject departs on the trophotropic or hypoarousal continuum. We contend that although both continua are hallucinatory, there are important differences between them. The physiological substrate of hyperaroused hallucinations may be characterized by heightened sympathetic responsiveness and increased tone of striate muscles – the ‘excitation syndrome’. Conversely, the substrate of hypoaroused hallucinations (transcendental meditation) involves increased parasympathetic responsiveness and muscular relaxation.”

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## Hyperchromatopsia

Also referred to as sparkling. The term hyperchromatopsia comes from the Greek words *huper* (to exceed a certain boundary), *chrōma* (colour), and *opsis* (seeing). It was coined in or shortly before 1999 by the British neuroscientists Dominic H. ffytche and Robert J. Howard. It is used to denote a subclass of the group of \*colour-processing deficits in which colours are seen as exceptionally vivid and brilliant. Hyperchromatopsia has been described in conditions such as degenerative eye disease, \*Charles Bonnet syndrome, and \*hallucinogen use.

### Reference

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## Hypercoenesthesiopathy

The term hypercoenesthesiopathy comes from the Greek prefix *huper* (to exceed a certain boundary), the medical Latin noun *coenesthesia* – which itself comes from the Greek words *koinos* (communal) and *aisthanesthai* (to notice, to perceive) – and the Greek noun *pathos* (suffering). The term *coenesthesia* was used during the era of classic psychiatry to denote the ‘common sensation’ or ‘common general sensibility’ arising from the sum of all bodily sense impressions. (For a further explanation, see the entry *Coenesthetic hallucination*.) The French term *hypercœnesthésiopathie* was introduced in or shortly before 1905 by the French neurologists Paul Camus and Gaston Deny to denote a hypertrophic awareness of one’s coenesthetic feelings. A clinical description of hypercoenesthesiopathy, rendered by the French psychiatrists Henri Hécaen (1912–1983) and Julian de Ajuriaguerra (1911–1993), runs as follows: “His whole body, but especially his hands and his teeth increased in volume; the hands grew larger, swelled up progressively, became very hard, and ended up taking on immense proportions; the teeth grew longer, and it appeared to him that they protruded out of his mouth. These impressions were accompanied by a certain anxiety, and brought him, several times, to turning on the light to verify the state of his hands, which he then perceived as having their

normal proportions. These sensations were symmetrical, and confined themselves to the upper part of the body; they did not disappear, except during periods of falling asleep and waking up." Camus and Deny classify hypercoenesthesiopathy as a variant of \*coenesthesiopathy and use the term in opposition to the terms \*acoenesthesiopathy, hypocoenesthesiopathy, and \*paracoenesthesiopathy. Today hypercoenesthesiopathy would probably be classified either as a \*somatic hallucination or illusion, a disorder of embodiment or a disorder of corporeal awareness. Pathophysiologically, hypercoenesthesiopathy is associated primarily with lesions affecting parts of the parietal cortex involved with embodiment and corporeal awareness (more specifically, the premotor cortex).

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## Hypergeusia

The term hypergeusia comes from the Greek prefix *huper* (to exceed a certain boundary) and the Latin noun *gustum* (taste). It refers to a \*chemosensory disorder characterized by an increased taste sensitivity to some or all tastants. Hypergeusia may also be classified as a type of \*hyperaesthesia. The term is used in opposition to hypogeusia. Hypergeusia is classified as a \*gustatory illusion (i.e. a taste illusion) or a chemosensory disorder.

### References

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Schiffman, S.S., Gatlin, C.A. (1993). Clinical physiology of taste and smell. *Annual Review of Nutrition*, 13, 405–436.

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## Hyperosmia

The term hyperosmia comes from the Greek words *huper* (to exceed a certain boundary) and *osmè* (smell, stink, fragrant, odour, scent, perfume). It is used to denote a \*chemosensory disorder characterized by an increased odour sensitivity to some or all odorants. Hyperosmia may also be classified as a type of \*hyperaesthesia. The term is used in opposition to hyposmia. Hyperosmia is classified as an \*olfactory illusion (i.e. a smell illusion) or as a chemosensory disorder.

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## Hyperpathia

The term hyperpathia comes from the Greek words *huper* (to exceed a certain boundary) and *patheia* (suffering, affliction, pain). It translates loosely as 'an exaggerated perception of pain'. The term is used to denote a condition characterized by an increased sensitivity to cutaneous stimuli such as a gentle touch, heat, or coldness, entailing a burning, painful sensation. Hyperpathia is usually classified as a type of \*hyperaesthesia. Pathophysiologically, it is associated primarily with a lowered threshold for cutaneous sensory stimuli. As a consequence, hyperpathia tends to affect the whole of one side of the body, but generalized hyperpathia has also been described. Etiologically, it is associated primarily with thalamic lesions due to cerebral haemorrhage, thrombosis, or a neoplasm. The term hyperpathia is used in opposition to the terms \*allodynia (which refers to a condition characterized by pain due to stimuli that do not normally evoke pain) and \*hyperalgesia (which refers to a condition similar to hyperpathia, but affecting a smaller part of the skin, due to its peripheral origin). It should not be confused with \*hallucinated pain.

**Reference**

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**Hyperschematia**

Also known as left size distortion. The term hyperschematia comes from the Greek words *hyper* (to exceed a certain boundary) and *schéma* (form, scheme, topographic map). It translates roughly as 'overly detailed mapping of space'. The term *hyperschématie* was introduced in or shortly before 1905 by the French neurologist Pierre Bonnier (1861–1918) to denote a variant of \*aschematia characterized by an exaggeration of the space occupied by some part of the body. Today the term is used to denote a left (i.e. contralesional) expansion of object representations due to a lesion to the right parietal lobe. Because of its subjective nature, hyperschematia cannot be observed directly in affected individuals. However, the condition can be inferred from drawings made by these individuals. In these drawings, the left side of a clock is characteristically enlarged and the petals on the left side of a daisy tend to be both larger and more numerous than those on the right. Hyperschematia is considered a productive, subconscious manifestation of neglect. It is usually classified as a \*body schema illusion. Although phenomenologically there is some overlap between hyperschematia and \*hemimicropsia, the two conditions differ in several respects: hemimicropsia may affect either of the spatial hemifields, individuals with hemimicropsia tend to be aware of their condition, and they perceive objects within the contralesional hemifield as being smaller and/or distorted in size. The term hyperschematia was used by Bonnier in opposition to the terms \*hyposchematia and \*paraschematia.

**References**

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**Hypnagogia**

The term hypnagogia comes from the Greek words *hupnos* (sleep) and *agein* (to lead, to transport). It was introduced in or shortly before 1983 by the Cypriot philosopher and psychologist Andreas Mavromatis as an umbrella term for the hypnagogic–hypnopompic states (i.e. the intermediate states between wakefulness and sleep), including all the phenomena and experiences encountered therein.

**Reference**

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**Hypnagogic Hallucination**

Also known as hypnagogic imagery, hypnagogic reverie, hypnagogic illusion, hypnagogic visualization, presomnal sensation, predormital hallucination, anthypnic sensation, oneirogagic image, \*phantasma, vision of half-sleep, and faces in the dark. The term hypnagogic hallucination is indebted to the Greek words *hupnos* (sleep) and *agein* (to lead, to transport). It translates roughly as 'a hallucination that leads the individual into sleep'. The Greek philosopher Aristotle (384–322 BC) has been credited with providing one of the earliest written references to hypnagogic hallucinations: "And indeed some very young persons, if it is dark, through looking with open eyes, see multitudes of phantom figures moving before them, so that they often cover up their heads in terror." The scientific study of these phenomena began in the 19th century with authors such as Johannes Peter Müller (1801–1858), Jules Gabriel François Baillarger (1806–1891), and Louis-Ferdinand-Alfred Maury (1817–1892). The term itself was introduced in or shortly before 1848 by Maury to denote a hallucination that occurs around the moment of falling asleep. Hypnagogic hallucinations (as well as their logical counterpart, referred to as \*hypnopompic hallucinations) are perceptual phenomena taking place in the intermediate state between wakefulness and sleep. Taken together, hypnagogic and hypnopompic hallucinations are referred to as \*hypnagogia. Hypnagogic hallucinations are regularly occur-

ring phenomena in individuals with and without a mental disorder. Although Müller and other 19th-century authors reported a lifetime prevalence of only 2% in adults, more recent studies tend to report incidence rates of 75% and higher. Some studies indicate that the incidence of hypnagogic hallucinations increases when accompanied by the use – or withdrawal from – therapeutics such as tricyclic antidepressants and opioids. An increased incidence has also been reported in association with various psychiatric and neurological disorders, including narcolepsy, anxiety disorders, depressive disorder, bipolar disorder, and adjustment disorder. Hypnagogic hallucinations can be extremely rich and diverse in nature. They are sometimes distinguished from \*dreams by their kaleidoscopically changing nature. It has also been argued that they are often experienced passively, whereas in dreams the subject tends to be personally involved. Hypnagogic hallucinations are usually of a visual, auditory, and/or tactile nature, although they can manifest themselves in any of the sensory modalities. The seeing of faces (i.e. \*facial hallucinations) has been reported as one of their most common manifestations (hence the name ‘faces in the dark’). Peculiar aspects of visual hypnagogic hallucinations include their ‘strange luminosity’, visions in the shape of \*microptic images, \*polyopia (i.e. seeing multiple images of a single object simultaneously), and \*synaesthesia. Because they occur when the eyes are either closed or confronted with a dark environment, visual hypnagogic hallucinations are also classified as \*closed-eye hallucinations. A classification of visual hypnagogic hallucinations devised by the Cypriot philosopher and psychologist Andreas Mavromatis, based on their phenomenological characteristics, comprises the categories ‘formless’, ‘designs’, ‘faces’, ‘figures, animals, and objects’, ‘nature scenes’, ‘scenes with people’, and ‘print and writing’. It has been suggested that all these types of visual hypnagogic hallucinations can develop out of the idioretinal light or \*Eigengrau, i.e. the greyish \*visual noise that is normally seen in perfect darkness. Some common examples of nonverbal auditory hypnagogic hallucinations are bangs, crashing noises, and explosions (referred to as the \*exploding head syndrome), fragments of music, and the ringing of a door bell. Some common examples of verbal auditory hypnagogic hallucinations are the sound of one’s name being called, apparently meaningless sounds, neologisms, quotes, seemingly irrelevant sentences, and references to spo-

ken conversations or texts one has recently been reading. Hypnagogic hallucinations in general may be accompanied by \*hallucinoid experiences such as \*sensed presence, \*incubus, and \*illusory movement experiences. Phenomenologically, hypnagogic hallucinations meet all the Esquirolian criteria for hallucinations except that they occur during the transitional phase between wakefulness and sleep. As a consequence, they have traditionally been set apart from the class of \*hallucinations proper. The mediation of hypnagogic hallucinations is associated primarily with instances of REM sleep occurring in the absence of other REM phenomena. For this reason, they have also been designated as REM dissociation phenomena. These tend to occur during sleep onset (i.e. during stage N1 sleep as recorded on the electroencephalogram). Conceptually, the notion of hypnagogic hallucination is related to the notion of \*phantasma as developed by the German physiologist and zoologist Johannes Peter Müller (1801–1858). A special variant of the group of hypnagogic hallucinations, with phenomena reminiscent of the early sensory history of the child, is known as the \*Isakower phenomenon. \*Nightmares occurring immediately upon falling asleep are referred to as \*hypnagogic nightmares. In a phenomenological, and perhaps a pathophysiological sense as well, hypnagogic hallucinations would seem to be related to \*desert hallucinations.

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### Hypnagogic Imagery

see Hypnagogic hallucination.

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### Hypnagogic Nightmare

Also referred to as sleep-onset nightmare. The term hypnagogic nightmare is indebted to the Greek words *hupnos* (sleep) and *agein* (to lead, to transport). It is used to denote a type of \*nightmare occurring during sleep onset (i.e. during stage N1 sleep as recorded on the electroencephalogram). Hypnagogic nightmares typically take the form of frightening \*hypnagogic hallucinations which interrupt the process of falling asleep and lead to a sudden return to the state of full wakefulness.

#### Reference

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### Hypnagogic Reverie

see Hypnagogic hallucination.

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### Hypnagogic Syndrome

The term hypnagogic syndrome is indebted to the Greek words *hupnos* (sleep) and *agein* (to lead, to transport). It was introduced in or shortly before 1987 by the Cypriot philosopher and psychologist Andreas Mavromatis to denote the basic characteristics of the hypnagogic and hypnopompic states (i.e. the transitional states between wakefulness and sleep during which \*hypnagogic and \*hypnopompic hallucinations can occur). Mavromatis distinguishes seven features characteristic of the hypnagogic syndrome, comprising psychophysical relaxation, shift to 'passive volition', shift to parasympathetic predominance, reduction of exteroceptive and proprioceptive input, psychological withdrawal, decreased arousal, and need or intention to sleep and/or \*dream.

#### Reference

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### Hypnagogic Visualization

see Hypnagogic hallucination.

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### Hypnalgia

Also known as dream pain. The term hypnalgia comes from the Greek words *hupnos* (sleep) and *algos* (pain). It is used to denote a pain occurring during the dream state.

#### Reference

Campbell, R.J. (1996). *Psychiatric dictionary. Seventh edition*. Oxford: Oxford University Press.

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### Hypnolepsy

see Narcolepsy and hallucinations.

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### Hypnopathy

see Narcolepsy and hallucinations.

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### Hypnopompic Hallucination

The term hypnopompic hallucination is indebted to the Greek words *hupnos* (sleep) and *pempein* (to accompany, to send away). It translates roughly as 'a hallucination that accompanies the individual when leaving the sleeping state'. The term was introduced in or shortly before 1892 by the British classical scholar, writer, and poet Frederic Myers (1843–1901) to denote a hallucination that accompanies the departure of sleep, "as when a dream-figure persists for a few moments into waking life". Hypnopompic hallucinations (as well as their logical counterpart, referred to as \*hypnagogic hallucinations) are perceptual phenomena taking place in the intermediate state between wakefulness and sleep. Taken together, hypnopompic and hypnagogic hallucinations are referred to as \*hypnagogia. Hypnopompic hallucinations are regularly occurring phenomena in individuals with and without a mental disorder. Some studies indicate that their

incidence may increase significantly with the use of – or withdrawal from – therapeutics such as tricyclic antidepressants and opioids. An increased incidence has also been reported in association with various psychiatric and neurological disorders, including \*narcoplepsy, anxiety disorders, depressive disorder, bipolar disorder, and adjustment disorder. Although primarily visual in nature, they can manifest themselves in any of the sensory modalities. When Myers defined the term hypnopompic hallucination, he appeared to reserve it primarily for visual phenomena (i.e. hypnopompic imagery). Common examples of hypnopompic imagery include a person standing at the foot of the bed, a face hovering over one's bed, and an intruder cowering in the corner of the room. Anticipatory scenes have been reported as well, such as seeing oneself getting out of bed, and starting one's typical early morning routine. When accompanied by the conviction that one is actually awake, such anticipatory hallucinations are designated as \*false awakenings. Hypnopompic hallucinations can also take the form of auditory percepts, notably in the form of speech or music which continue for a while after one has awoken. Hypnopompic hallucinations in general can be accompanied by \*hallucinoid experiences such as \*sensed presence, \*incubus, or \*illusory movement experiences. Phenomenologically, hypnopompic hallucinations meet all the Esquirolian criteria for hallucinations except that they occur during the transitional phase between wakefulness and sleep. As a consequence, they have traditionally been set apart from the class of \*hallucinations proper. As regards pathophysiology, the mediation of hypnopompic hallucinations is associated primarily with instances of \*REM sleep occurring in the absence of other REM phenomena. Therefore, they have also been designated as REM dissociation phenomena. In a phenomenological, and possibly a pathophysiological sense as well, hypnopompic hallucinations would seem to be related to \*desert hallucinations.

### References

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## Hypnosis

see Hypnotism and hallucinations.

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## Hypnotic Blindness

The term hypnotic blindness refers to the notion of hypnosis, which is in turn indebted to the Greek noun *hupnos* (sleep). It is used to denote a hypnotically induced failure to consciously perceive an object or stimulus which is present in the external world and which lies within the subject's field of vision. This failure to perceive is traditionally designated as a \*negative hallucination. Conceptually as well as phenomenologically, hypnotic blindness differs from true \*blindness in that it is transient and reversible, that it can be evoked by suggestion, and that the resulting 'blindness' tends to confine itself to a segment of the visual field (notably a physiologically unlikely segment). Following a hypnotist's suggestion, the individual may be exclusively blind for an object or person within his range of vision. A further phenomenological difference between hypnotic blindness and true blindness is that the implicit or unconscious perception of the object or stimulus may remain intact, as can be inferred from priming tests. This is the reason why hypnotic blindness is usually conceptualized as a failure of *conscious* visual perception.

### Reference

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## Hypnotic Hallucination

see Hypnotically induced hallucination.

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## Hypnotically Induced Hallucination

Also referred to as hypnotic hallucination and induced hallucination. The first two terms refer to the notion of hypnosis, which is in turn indebted to the Greek noun *hypnos* (sleep). The term hypnotically induced hallucination is used to denote a vivid hallucination that can be evoked in another person through suggestion. The phenomenon has been described since the era of mesmerism. It is often experienced in the visual modality, but it can manifest itself in any of the sensory modalities, as well as in various sensory modalities simultaneously. In the latter case, it is referred to as a \*compound hallucination. When it replaces the entire sensory input picture, it is known as a \*panoramic or \*scenic hallucination. These elaborate types of hallucinations are also referred to as \*lucid dreams. As noted by the French scientists Charles Féré (1852–1907) and Alfred Binet (1857–1911), hypnotically induced hallucinations occurring in the visual modality tend to be experienced under the same phenomenological conditions as ordinary sense perceptions. Binet found, for example, that a screen placed before the eyes of an individual with hypnotically induced visual hallucinations may entail the cessation of that hallucination, as would have been the case with an actual object disappearing behind the screen, while in other cases the hallucinations are projected upon the screen. Binet also noted that in some individuals with a unilateral \*colour vision deficiency it is impossible to suggest a coloured hallucination to the colour-blind eye, whereas in others this suggestion proves successful. In conformity with the findings of the Scottish physicist David Brewster (1781–1868), Binet also noted that hypnotically induced visual hallucinations can be doubled by exerting mechanical pressure on the eye with the aid of a prism. Using a spy glass can yield a magnification of these hallucinations or obstruct the percipient's view, whereas mirrors tend to reflect them in accordance with the laws of physics. Experimental research carried out by the American psychologist Cheves West Perky (1874–1940) with the aid of projected images would seem to corroborate these findings. When it was suggested to hypnotized individuals that they might hallucinate a certain shape, they were barely influenced by the presence or absence

of a projected image of that particular shape. As the Australian psychologists Richard A. Bryant and David Mallard maintain, "Participants who had the projection absent and then present reported comparable reality and vividness ratings when the projection was absent and present. These findings indicate that elevated hypnotizability and hypnosis are associated with attributions of external reality to suggested experiences." This phenomenon is known as the \*Perky effect.

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## Hypnotism and Hallucinations

Hypnotism is known under many names, including hypnosis, neurohypnosis, neurypnology, artificial somnambulism, and Braidism. All these terms are used to denote the procedure or the state induced by that procedure, by means of which a hypnotist establishes *rapport* in a receptive subject, so that the subject is persuaded to experience changes in consciousness, perception, cognition, emotion, volition, and/or motor behaviour in accordance with the hypnotist's suggestions. When subjects hypnotize themselves, this is known as autohypnosis. When they are hypnotized by a third person, i.e. a hypnotist, the term heterohypnotism is used. Conceptually as well as phenomenologically, hypnotic states are related to other states of altered consciousness such as rapture, \*ecstasy, \*dissociation, \*trance, and somnambulism. Historically, the theory of hypnotism was preceded by the theory of animal magnetism or mesmerism. The terms hypnotism and hypnosis stem from the Greek



noun *hupnos*, which means sleep. It is not clear who introduced them. What we do know is that the term *hypnologie* appeared in the second edition of Morin's *Dictionnaire Étymologique* published in 1809 and that in 1820 various terms with the prefix 'hypn-' figured in the mesmerist works of the French magnetist Baron Etienne Félix d'Hénil de Cuvillers (1755–1841). From 1842 on, the Scottish neurosurgeon James Braid (1796–1860) used the terms *neurypnology*, *neurohypnosis*, and *hypnosis* to denote the somnolent state which he considered the physiological correlate of mesmerism. According to Braid, mesmerists did not establish *rapport* by means of animal magnetism or any variant thereof, but by inducing a "nervous sleep" which in his opinion differed somewhat from ordinary sleep. His own favourite method for producing this state was through visual fixation on a small bright object held 18 in. above and in front of the eyes, thus forcing the subject into a 'Braid's strabismus'. At the time, Braid attributed the efficacy of this manoeuvre to the over-exercising of the eye muscles. After much experimentation, however,



Fig. 8 James Braid

he came to the conclusion that the majority of hypnotic states can be induced without the interference of sleep in any form. Realizing that the term *hypnotism* was therefore inappropriate, in 1847 he proposed replacing it by *monoideism*. However, by that time the terms *hypnotism* and *hypnosis* had gained such wide acceptance that the term *monoideism* failed to catch on. Hypnotic states can be induced in a multitude of ways, including fixation of the subject's gaze, exposure to movement, colours or sounds, and suggestion. The hypnotic state is commonly divided into three stages: light hypnosis (in which the subject is lethargic, but aware of his or her surroundings), the cataleptic state (characterized by muscular rigidity), and the somnambulistic state (i.e. a deep \*trance during which the subject tends to be the most compliant to the hypnotist's suggestions). During the latter stage, in particular, \*illusions and hallucinations can be induced. In biomedicine these are referred to as *hypnotic* or \*hypnotically induced hallucinations. It is generally held that the perceptual material brought to the surface in this way derives from unconscious or subconscious material. In this sense, hypnotic hallucinations can perhaps best be regarded as \*release phenomena. In parapsychology, some hypnotic hallucinations are designated as 'higher phenomena'. These include \*clairvoyance, \*clairaudience, \*telepathic phenomena, \*remote viewing, and \*eyeless vision. A type of hallucination which appears to be largely restricted to the context of hypnosis is the \*negative hallucination.

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### Hypoaroused Hallucination

The term *hypoaroused hallucination* is indebted to the Greek prefix *hupo* (below, beneath) and

arousal (state of alertness and readiness for action). It was probably introduced in 1969 by the American psychopharmacologist Roland Fischer to denote a hallucination mediated under the influence of increased parasympathetic responsiveness and muscular relaxation, such as may occur during meditation. Fischer uses the term hypoaroused hallucination in opposition to \*hyperaroused hallucination. Both notions derive their meaning from the context of a \*release model of hallucinatory activity, which attributes the content of hallucinations to subcortical neurophysiological activity, and its release to either hypo- or hyperarousal. As Fischer maintains, "We may distinguish two types of hallucinatory behaviour: that which increases in intensity when one moves along the perception-hallucination continuum of ergotropic or hyperarousal and that which spiritualizes when a subject departs on the trophotropic or hypoarousal continuum. We contend that although both continua are hallucinatory, there are important differences between them. The physiological substrate of hyperaroused hallucinations may be characterized by heightened sympathetic responsiveness and increased tone of striate muscles – the 'excitation syndrome'. Conversely, the substrate of hypoaroused hallucinations (transcendental meditation) involves increased parasympathetic responsiveness and muscular relaxation."

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## Hypoglycaemia-Induced Hallucination

Hypoglycaemia is also written as hypoglycemia. Both terms stem from the Greek words *hupo* (below, beneath), *gleukos* (must), and *haima* (blood). They translate as 'low blood sugar'. The introduction of the term hypoglycaemia is commonly attributed to the American physician Seale Harris (1870–1957). After the discovery of insulin in 1921 by the medical scientists Frederick Grant Banting (1891–1941), John James Richard Mcleod (1876–1935), and Charles Herbert Best

(1899–1978), Harris studied the effects of hyperinsulinism in 1923 and formulated his hypothesis of the hypoglycaemic attack. Hypoglycaemia is generally thought to be a rare condition, although certain authors suspect that it may be quite common. It is defined by a blood glucose level below the physiological threshold. That threshold is commonly cited as lying between 60 and 70 mg/dl, but for different populations and different clinical and research purposes, it may be 40, 50, or 60 mg/dl. The clinical presentation of hypoglycaemia in adults includes such diverse symptoms as fatigue, confusion, vertigo, nervousness, profuse sweating, tachycardia, mydriasis, ataxia, dysarthria, \*paraesthesiae, headache, anxiety, negativism, irritability, and epileptic seizures. It may develop further into a hypoglycaemic coma and eventually death. Although descriptions of this clinical syndrome were not new, it was only after the introduction of insulin therapy that it became associated with low blood sugar. Etiologically, hypoglycaemia is associated primarily with an inadequate intake of carbohydrates and with insulin overdosage. It can be complicated by \*simple or \*geometric visual hallucinations, including \*scintillating scotomata, and phenomena that comply with the \*form constants as described by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979). These hypoglycaemia-induced hallucinations may or may not occur in the context of a \*twilight state or an \*aura preceding a hypoglycaemic epileptic seizure. Psychosis-like \*auditory and \*visual hallucinations have also been reported.

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## Hyposchematia

The term hyposchematia comes from the Greek words *hupo* (below, beneath) and *schéma* (form, scheme, topographic map). It translates roughly as 'insufficiently detailed mapping of space'. The term *hyposchématie* was introduced in or shortly before 1905 by the French neurologist Pierre Bonnier (1861–1918) to denote a variant of \*aschematia characterized by an underestimation of the space occupied by some part of the body. Today the term hyposchematia is used to denote a left (i.e. contralesional) shrinkage of object representations due to a lesion of the right parietal lobe. Because of its subjective nature, hyposchematia cannot be observed directly in the affected individual. However, the presence of the condition may be inferred from drawings made by these individuals. The left side of a clock characteristically is smaller than the right side, and the petals on the left side of a daisy tend to be both smaller and less numerous than on the right. Hyposchematia is considered a productive, subconscious manifestation of neglect. It is usually classified as a \*body schema illusion. The term hyposchematia was used by Bonnier in opposition to the terms \*hyperschematia and \*paraschematia.

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## Hysterical Blindness

Also known as conversive blindness. The term hysterical blindness is indebted to the term hysteria, which is in turn indebted to the Greek noun *hysterá* (uterus). The term hysteria reflects the ancient conviction that some types of mental illness in women are causally related to a disease of the uterus, in some versions a 'wandering uterus'. The term hysterical blindness is used to denote a failure to consciously perceive an object or stim-

ulus which is present in the extracorporeal world and which lies within the subject's field of vision. This allegedly 'hysterical' failure is traditionally designated as a \*negative hallucination. Conceptually as well as phenomenologically, hysterical blindness differs from true \*blindness in that it is transient and reversible, that it can be evoked by suggestion or autosuggestion, and that the resulting 'blindness' may confine itself to a physiologically unlikely segment of the visual field. An individual with hysterical blindness can be exclusively blind, for example, for an object or person within their range of vision. A further phenomenological difference between hysterical blindness and true blindness is that the implicit or unconscious perception of the object or stimulus may remain intact, as can be inferred from priming tests. This is the reason why hysterical blindness is usually conceptualized as a failure of *conscious* visual perception.

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## Hysterical Hallucination

The term hysterical hallucination is indebted to the term hysteria, which is in turn indebted to the Greek noun *hysterá* (uterus). The term hysteria reflects the ancient conviction that some types of mental illness in women are causally related to a disease of the uterus, in some versions a 'wandering uterus'. The term hysterical hallucination is used to denote a hallucination occurring in the context of hysteria. It has been suggested that these hallucinations tend to occur during episodes of clouded or narrowed consciousness (i.e. during \*twilight states), that they have a sudden and dramatic onset, and that they are often precipitated by a profoundly upsetting situation or event. The term hysterical hallucination is often used as more or less synonymous with \*dissociative hallucination.

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**Hysterical Twilight State**

see Twilight state and hallucinations.

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## Ianothinopsia

Also known as violet vision and purple vision. The term ianothinopsia comes from the Greek words *ianthinos* (violet) and *opsis* (seeing). It is used to denote a \*chromatopsia (i.e. a temporary aberration of colour vision) in which whites are seen as purplish or violet. Ianothinopsia tends to be classified as an \*entoptic phenomenon. The term is used in opposition to the terms \*cyanopsia (blue vision), \*chloropsia (green vision), \*erythroptopsia (red vision), and \*xanthopsia (yellow vision).

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## Ibn al-Haytham

see Alhazan.

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## Icelus

see Phobetor.

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## Ichthyallyeinotoxism

Also known as hallucinogenic fish poisoning. The term ichthyallyeinotoxism comes from the Greek words *ichthus* (fish), *aluein* (to be out of oneself, to hallucinate), and *toxikon* (venom). It is used to denote a rare hallucinogenic intoxication due to the consumption of the head or other body parts of a fish belonging to the group of \*dream fish, many species of which are indigenous to the Indian and Pacific Oceans, and the Mediterranean Sea. Because of their psychoactive effects, such fish species are referred to as \*psychoactive fauna. Ichthyallyeinotoxism is classified as a variant of ichthyosarcotoxism, i.e. food poisoning caused by the ingestion of fish. The symptoms typically commence within a few minutes to 2 h after the consumption of fish, and they usually last no longer than 36 h. Ichthyallyeinotoxism is characterized by generalized malaise and a variety of CNS disturbances such as nausea, vertigo, disturbances in motor coordination, vivid \*visual and/or \*auditory hallucinations, \*nightmares, and sometimes frank \*delirium. The hallucinations occurring in the context of ichthyallyeinotoxism are sometimes compared to those occurring in LSD intoxication. The toxin or toxins responsible for the medication of ichthyallyeinotoxism are unknown. As all ichthyallyeinotoxic fishes appear to be algal grazers, it is believed that they may derive their hallucinogenic properties from alkaloids of the

indole group, which are chemically quite similar to LSD, and which occur naturally in certain types of algae and phytoplankton. It has also been suggested that ichthyoallyeinotoxism may be mediated by \*dimethyltryptamine (DMT), a \*hallucinogen even more potent than the indoles present in fish.

#### Reference

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### Ictal Blindness and Hallucinations

The term ictal blindness is indebted to the Latin noun *ictus*, which means blow or thrust. In neurology the term ictus denotes a paroxysmal epileptic seizure. The term ictal blindness refers to a rare amaurotic state occurring in the context of epileptic seizures affecting the occipital lobe. It may present in a variety of forms, including homonymous \*hemianopia and tunnel vision. When both occipital lobes are involved, ictal blindness may present as complete \*blindness. Ictal blindness may last for hours to days (in the latter case referred to as a status epilepticus amauroticus), and it is generally amenable to anti-convulsant treatment. The pathophysiology of ictal blindness is associated primarily with the active inhibition of cortical visual processing at some level of the visual pathways. Etiologically, the epileptic seizures underlying ictal blindness are associated primarily with vascular lesions, metastatic lesions, and idiopathic epilepsy. Like other types of blindness, ictal blindness can be complicated by \*visual hallucinations reminiscent of \*Charles Bonnet syndrome.

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### Ictal Hallucination

The term ictal hallucination is indebted to the Latin noun *ictus*, which means blow or thrust. In neurology the term ictus is used to denote a paroxysmal epileptic seizure. The term ictal hallucination refers to a hallucination occurring in the context of an \*aura or a partial epileptic seizure, but it also applies to hallucinations evoked by means of cortical probing. Phenomenologically, ictal hallucinations tend to be \*complex or \*compound in nature. As the American neurologist Maitland Baldwin (1918–1970) maintains, “Each ictal hallucination is cinematic. It may unreel as a very detailed scene or present as a simple part of the more complex whole.” The British neurologists John Hughlings Jackson (1835–1911) and Charles Beevor (1854–1908) are commonly credited with opening up the study of ictal hallucinations through their 1889 case report of a woman experiencing \*visual and \*olfactory hallucinations. In the authors’ description: “The patient was a cook. In paroxysm the first thing was tremor of the hands and arms; she saw a little black woman who was always actively engaged in cooking; the spectre did not speak. The patient had a very horrible smell (so-called subjective sensation of smell which she could not describe)... She never believed that the spectre was a real person! The patient proved to have a tumour of the right temporo-sphenoidal lobe.” Tumours such as the one described by Jackson and Beevor, as well as other neoplastic lesions, are thought to mediate ictal hallucinations by causing epileptogenic processes in the affected lobe. Ictal hallucinations are often accompanied by \*metamorphopsias (i.e. distortions of visual perception), and/or \*illusions of sound and colour (i.e. ‘unnaturally bright’ or ‘sharp’ sense perceptions). Pathophysiologically, ictal hallucinations are traditionally associated with partial epileptic seizures affecting the temporal lobe. However, the parietal and occipital lobe may also be involved in their mediation. Moreover, ictal hallucinations presenting in the form of \*reperceptions have been linked to aberrant activity in the limbic system. The term ictal hallucination is used in opposition to the term \*non-ictal hallucination, and – from a different vantage point – \*ictal illusion.

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**Ictal Illusion**

The term ictal illusion is indebted to the Latin noun *ictus*, which means blow or thrust. In neurology the term *ictus* refers to a paroxysmal epileptic seizure. The term ictal illusion is used to denote an \*illusion that occurs in the context of an \*aura or a related seizure disorder. The term is used in opposition to \*ictal hallucination. The distinction between ictal illusions and ictal hallucinations is similar to that between non-ictal illusions and hallucinations. Thus ictal illusions are conceptualized as misperceptions of actually perceived objects or stimuli, whereas ictal hallucinations are considered to be percepts that arise in the absence of an appropriate object or stimulus in the extracorporeal world. Both, however, arise as a consequence of a focal epileptic seizure.

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**Ictal Metamorphopsia**

The term ictal metamorphopsia comes from the Latin noun *ictus* (thrust, blow) and the Greek words *metamorphouin* (to change the form) and *opsis* (seeing). It is used to denote a type of \*metamorphopsia (i.e. a visual distortion) attributable to a simple partial epileptic seizure or status epilepticus affecting specific cell columns in the visual association cortex.

**References**

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**Ictal Religious Experience**

The term ictal religious experience is indebted to the Latin noun *ictus* (thrust, blow). It is used to denote a religious experience taking place during an epileptic seizure. The duration of this experience is usually seconds to minutes, although in the perception of the affected individual it may seem to last much longer (see also the entry Time distortion). Empirical research indicates that such religious experiences occur in 0.4–3.1% of individuals with partial epileptic seizures. It has been suggested that the limbic system – in addition to the temporal lobe – may play a crucial role in the mediation of these phenomena. The \*visual, \*auditory, and \*compound hallucinations that may accompany the experience are also designated as \*religious hallucinations. They have been attributed to the involvement of temporal and occipital cortical areas. Ictal religious experiences are classified as \*ecstatic auras or ecstatic seizures. The term ictal religious experience is used in opposition to \*postictal religious experience and \*interictal religious experience.

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**Idea of a Presence**

see Sensed presence.

**Ideoplasm**

see Ectoplasm.

**Idionecrophany**

The term idionecrophany comes from the Greek words *idios* (private, one's own), *nekros* (dead), and *phainestai* (to appear). It was proposed in or shortly before 1992 by the American sociologist William L. Macdonald to denote any sensory experience involving a claimed contact with the dead. The term was introduced to solve the dilemma of having to choose between labelling such experiences as hallucinations or \*apparitions (in the sense of spectres or ghosts).

**Reference**

Macdonald, W.L. (1992). Idionecrophanies: The social construction of perceived contact with the dead. *Journal for the Scientific Study of Religion*, 31, 215–223.

**Idiopathic Autoscopy**

The term idiopathic autoscopy comes from the Greek words *idiopatheia* (affliction of a local origin), *autos* (self), and *skopeō* (I am looking at). It is used to denote a type of \*autoscopy (i.e. 'seeing oneself') not attributable to an organic disorder. The term is used in opposition to \*symptomatic autoscopy. For a further explanation, see the entries Autoscopy, Autoscopic phenomenon, and Autoscopic hallucination.

**Reference**

Campbell, R.J. (1996). *Psychiatric dictionary. Seventh edition*. Oxford: Oxford University Press.

**Idiopathic Synaesthesia**

Also known as developmental synaesthesia. The term idiopathic synaesthesia is indebted to the Greek words *idiopatheia* (affliction of a local origin), *sun* (together, unified), and *aisthanesthai* (to notice, to perceive). It is used to denote a type of \*synaesthesia with unknown origin, which is usually present as long as the affected individual can remember. The term idiopathic synaesthesia is used in opposition to \*non-idiopathic synaesthesia.

**Reference**

Harrison, J. (2001). *Synaesthesia. The strangest thing*. Oxford: Oxford University Press.

**Idiophany**

The term idiophany comes from the Greek words *idios* (private, one's own) and *phainestai* (to appear). It was proposed in or shortly before 1983 by the Canadian-American psychiatrist Ian Pretyman Stevenson (1918–2007) as an umbrella term for all unshared sensory experiences. Stevenson's proposal stemmed from his dissatisfaction with the practice to designate both pathological and claimed paranormal unshared sensory experiences as hallucinations. As a corollary of this proposal, Stevenson prefers to reserve the term hallucination exclusively for unshared sensory experiences occurring in the mentally ill.

**Reference**

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**Idioretinal Light**

see *Eigengrau*.

**Idioretinal Phenomenon**

see *Retinogenic phenomenon*.



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### Idioretinal Sensation

see *Retinogenic phenomenon*.

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### Idolum

*Idolum* is Latin for shade, ghost, spectre. The term is used in the older literature to denote a false idea, \*illusion, or hallucination.

### Reference

Campbell, R.J. (1996). *Psychiatric dictionary. Seventh edition*. Oxford: Oxford University Press.

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### Ikelos

see Phobeter.

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### Illicit Substances and Hallucinations

see Drug-induced hallucinations.

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### Illusinogen

see Hallucinogen.

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### Illusio

see Illusion.

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### Illusion

Formerly known as *illusio*, \*fallacia, and \*idolum. The term illusion comes from the Latin verb *illudere*, which means to mock, to delude, to tempt. It is unknown when and by whom the term was introduced, but it has been in use since ancient times. It has also had numerous connotations, most of them revolving around the notion of a false percept or idea. The French alienist Jean-Etienne Dominique Esquirol (1772–1840) is traditionally credited

with giving the term illusion its current global meaning, i.e. a percept which is based on an object or stimulus in the external world, but is either misperceived or misinterpreted. Esquirol is also credited with distinguishing illusions from hallucinations, although it has been noted by the American historians of psychiatry Gregory Zilboorg (1890–1960) and George W. Henry (1890–1964) that a similar conceptual distinction was made in the second century AD by the physician Aretaeus of Cappadocia (c. AD 150). In 1832 Esquirol depicted illusions as a type of \*sensory deception in which “there is always an actual impression upon the senses of external objects”. Some common examples of such illusions are a face seen in the pattern of a carpet, a tree misidentified as a person, and a shadow held to be a cat. Esquirol tentatively attributes the mediation of illusions to the influence of the sense organs. As he argues, “In illusions . . . the sensibility of the nervous extremities is altered: it is exalted, enfeebled, or perverted. The senses are active, and the actual impressions solicit the reaction of the brain.” Thus Esquirol inserts a caesura between hallucinations and illusions as regards the involvement of the sense organs. And yet he does not regard the sense organs as the necessary locus of their origin. In his view, illusions can be mediated by the sense organs, the afferent nerves, or the brain. But he refuses to regard them as a product of cerebral or mental activity *alone*, which he believes is true of hallucinations. Like the Greek philosopher Aristotle (384–322 BC) long before him, Esquirol observes that the tendency to create illusions is promoted by affect-laden preoccupations. Theoretically, illusions can occur in any of the sensory modalities. However, most clinical examples involve the visual or auditory modality. Throughout medical history, illusions have been classified in a multitude of ways. The earliest known classification of illusions was the work of the Arab mathematician \*Alhazan (c. 965–1040). Alhazan focuses primarily on \*physical illusions such as reflections from curved surfaces and atmospheric refraction, but he also draws attention to the part played by knowledge and inference in the mediation of illusions. A division of illusions proposed by Esquirol is based on their having recourse to stimuli originating from within or from outside the body. He calls those illusions which arise as a consequence of stimuli from outside the body – such as a shadow or a tree – \*illusions of the senses. Illusions arising in reaction to

stimuli from inside the body are designated as \*ganglionic illusions. Judging by the examples of ganglionic illusions given by Esquirol – including pain originating from an abdominal adhesion which the affected individual attributed to the popes holding council in her bowels, and a headache attributed to an intracerebral worm – ganglionic illusions in the esquirolian sense would today no doubt be labelled somatic hallucinations or somatic delusions. In addition to these esquirolian subclasses, a third subclass was proposed by the Russian psychiatrist Victor Kandinsky (1849–1889). In referring to this subclass, he uses the terms \*delirium of the senses and \*mistaken identity. Both these terms apply to cases in which a person consistently misidentifies another person. And yet, in spite of conceptual refinements and classificatory additions such as those above, the notion of an illusion has always remained somewhat problematic. As noted in 1894 by the German hallucinations researcher Edmund Parish (1861–1916), “Mere misinterpretations of sense-perceptions should not be regarded as sensory fallacies. In the long run, therefore, no satisfactory theory can be based on Esquirol’s distinction, as is sufficiently indicated by the many unsuccessful attempts to reach one. But, generally speaking, nearly all the observers are agreed to consider illusion as a mixture of subjective and objective elements of perception, or as an incomplete sensory delusion, and to restrict the word hallucination entirely to new sensory creations.” On the basis of the indebtedness of illusions to both subjective and objective elements of perception, a classification of illusions has been proposed which consists of physical illusions, \*physiological illusions, and \*cognitive illusions. In this context the term physical illusion refers to an illusion arising primarily as a consequence of the physical properties of an object or stimulus present in the extracorporeal world. Thus physical illusions are naturally occurring phenomena which theoretically can be observed by any person in possession of the necessary perceptual capacities. Some examples of phenomena which fall into this class of illusions are the \*rainbow, the \*mirage, the \*antherion, mirror images, and the Moiré pattern. In the present context the term physiological illusion is used to denote an illusion arising as a consequence of the perceptual system’s inherent characteristics. The occurrence of this type of illusion is as inevitable as the physical illusion, but it does not entail an objectively observable

phenomenon. Some examples of illusions which fall into this category are the \*afterimage, the \*after-effect, and the contrast effect. In the same context the term cognitive illusion is reserved for those illusions most indebted to an active contribution of the brain’s (or mind’s) unconscious inferences about the nature of the extracorporeal world. Some examples of phenomena commonly regarded as cognitive illusions are \*geometric-optical illusions, so-called impossible figures (as in the drawings by the Dutch graphic artist Maurits Cornelis Escher (1898–1972)), and the \*Necker cube. A further division of each of these three classes of illusions has been proposed by the British psychologist Richard Langton Gregory (b. 1923). In an effort to do justice to the various effects elicited by physical, physiological, and cognitive illusions, Gregory suggests further dividing each category into four subcategories: \*ambiguous illusions, \*distortion illusions, \*paradox illusions, and \*fiction illusions. The identification and classification of illusions, whether they occur naturally or in the context of neurologic or psychiatric disease, or are designed by experimental psychologists, have yielded a plethora of phenomena and arrangements. Some of the phenomena can be explained with reference to contemporary physical, neurophysiological, and neuropsychological theories, while others (such as the \*Moon illusion and the long-distance \*mirage) still lack a satisfying explanation, even though they have been known since ancient times.

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### ***Illusion des Sosies***

A French term proposed in 1923 by the French psychiatrist Jean Marie Joseph Capgras (1873–1950) and his intern Jean Reboul-Lachaux to denote what would later come to be known as \*Capgras' syndrome (i.e. illusion of doubles). The expression *illusion des sosies* was inspired by the play *Amphytrion* by the Roman playwright Titus Maccius Plautus (250?–184 BC), in which the god Mercury takes on the identity of Sosie, one of Amphytrion's servants.

#### **Reference**

Capgras, J., Reboul-Lachaux, J. (1923). L'illusion des "sosies" dans un delire systematisé. *Bulletin de la Société de Médecine Mentale*, 11, 6–16.

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### **Illusion of Comparative Interpretation**

see Psychological illusion.

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### **Illusion of Corporeal Displacement**

see Body schema illusion.

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### **Illusion of Corporeal Transformation**

see Body schema illusion.

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### **Illusion of Doubles**

see Capgras' syndrome.

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### **Illusion of False Recognition**

see Capgras' syndrome.

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### **Illusion of Illusion**

An expression introduced in or shortly before 1998 by the French research scientist Jacques Ninio (b. 1942) to denote a bizarre perceptual phenomenon, usually reported by an author in support of a cherished idea, that proves to be unfounded. An example of an illusion mentioned by Ninio is the notion put forward by the Greek philosopher Aristotle (384–322 BC) that "the yellow we see in the rainbow is not really there, but an appearance resulting from the juxtaposition of red and green". This notion is at variance with spectrometric findings and is therefore considered an illusion of illusion.

#### **Reference**

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### **Illusion of Immanence**

The term illusion of immanence comes from the Latin words *illudere* (to mock, to delude, to tempt) and *immanere* (to remain in). It was introduced in or shortly before 1940 by the French existentialist philosopher Jean-Paul Sartre (1905–1980) to denote the popular misconception that visually imagined objects constitute images existing somewhere *inside* human consciousness. As Sartre argues, consciousness does not consist of a 'space' where images are housed.

#### **Reference**

Sartre, J.-P. (1940). *L'imaginaire: Psychologie, phénoménologique de l'imagination*. Paris: Gallimard.

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### **Illusion of Recognition**

A term introduced in or shortly before 1959 by the Canadian neuroscientists Wilder Graves Penfield (1891–1976) and Sean Francis Mullan (b. 1925) to denote an illusory perception of one's present environment or state in which things seem familiar, strange, altered, or unreal. Judging by the examples given by Penfield and Mullan, their conception of the illusion of recognition is quite

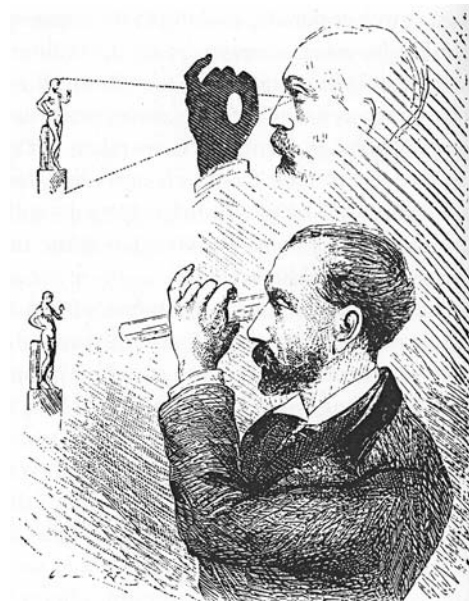
similar to the *déjà* experience. As employed by these authors, illusions of recognition are classified as *psychical* illusions, which themselves fall into the category of *psychical* states (i.e. *aurae* occurring in the wake of an epileptic seizure or during a cortical probing experiment). In this specific context, the term illusion of recognition is used in opposition to the terms *auditory* illusion, *visual* illusion, *illusional* emotion, and a nameless remaining group containing relatively rare phenomena such as illusions of increased awareness, illusions of alteration in the speed of movement, and visuo-vestibular disturbances.

#### Reference

Mullan, S., Penfield, W. (1959). Illusion of comparative interpretation and emotion. *Archives of Neurology and Psychiatry*, 81, 269–284.

### Illusion of the Pierced Hand

Also known as hole-in-the-hand. Both terms refer to a *binocular* illusion that can be induced by



**Fig. 1** Illusion of the pierced hand. Source: Gaston Tissandier, *La Nature*, 1881

holding a small tube in front of one eye with one hand, while the palm of the other hand is placed with the ulnar edge touching the tube about 20 cm in front of the other eye. By focusing on a point in the distance, it will appear as if one is looking through a hole in one's hand. The first description of the phenomenon stems from an 1881 article by the American geologist Joseph LeConte (1823–1901).

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LeConte, J. (1881). *Sight: An exposition of the principles of monocular and binocular vision*. New York, NY: Appleton.

Ninio, J. (2001). *The science of illusions*. Translated by Philip, F. Ithaca, NY: Cornell University Press.

### Illusion of the Senses

A term introduced in or shortly before 1832 by the French alienist Jean-Etienne Dominique Esquirol (1772–1840) to denote an *illusion* that has a bearing on one or more objects present in the external world. Esquirol uses the term in opposition to the term *ganglionic* illusion, a notion that he reserves for illusions arising as a consequence of stimuli from inside the body. Illusion of the senses is conceptually compatible with Kandinsky's notion of *sensory* misperception.

#### Reference

Esquirol, J.-E.D. (1965). *Mental maladies. A treatise on insanity. A facsimile of the English edition of 1845*. Translated by Hunt, E.K. New York, NY: Hafner Publishing Company.

### Illusional Emotion

A term introduced in or shortly before 1959 by the Canadian neuroscientists Wilder Graves Penfield (1891–1976) and Sean Francis Mullan (b. 1925) to denote a feeling of fear, loneliness, sorrow, or disgust, occurring in the context of a *psychical* state, and described by the affected individuals as "independent of themselves", i.e. unrelated to their conscious thoughts and feelings. Penfield and Mullan classify illusional emotions as *psychical* illusions, which are themselves classified as *psychical* states (i.e. *aurae* occur-

ring in the wake of an epileptic seizure or during a cortical probing experiment). In this specific context the term illusional emotion is used in opposition to the terms \*auditory illusion, \*visual illusion, \*illusion of recognition, and a nameless remaining group containing relatively rare phenomena such as illusions of increased awareness, illusions of alteration in the speed of movement, and visuo-vestibular disturbances. For at least two reasons, it is debatable whether illusional emotions merit classification as \*illusions. In the first place, illusional emotions are emotional as opposed to perceptual phenomena. Moreover the very concept of an illusional emotion would appear to be in contradiction with the philosophical argument that a subjective experience such as an emotion cannot be imagined or 'unreal'. In philosophy this is known as the self-intimating aspect of emotions. As a consequence, Penfield and Mullan's notion of illusional emotion can perhaps be best described as a true emotion evoked in the extraordinary context of an aura, and therefore not directly related to the life of the affected individual outside this context.

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- Mullan, S., Penfield, W. (1959). Illusion of comparative interpretation and emotion. *Archives of Neurology and Psychiatry*, 81, 269–284.

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### Illusionism

A term introduced in or shortly before 1895 by the Austrian art historian Franz Wickhoff (1853–1909), a member of the Vienna School of Art History, to denote the use of pictorial techniques such as perspective and foreshortening with the aim of achieving a high degree of mimesis (i.e. imitation of the external world), and to thus fool the onlooker into believing that what is painted is real. A striking example of illusionist painting is the *Panorama Mesdag*, a huge cylindrical painting by the Dutch painter Hendrik Willem Mesdag (1831–1915). The painting is set in a fake foreground consisting of sand and set props, and depicts the fisherman's village of Scheveningen, the sea, and the adjacent dunes. The term illusionism is also used to denote any doctrine that treats the material world as an \*illusion of the senses. For an account of illusionism in the latter sense,

see the entry Grand illusion argument. A third sense in which the term illusionism is used is to denote a set of tricks and techniques employed by stage magicians to suggest the performance of a miracle.

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### Illusive Conception

Also known as spectral illusion. The two terms were introduced as synonyms in 1847 by the British surgeon Walter Cooper Dendy (1794–1871), denoting a subclass of 'ghosts of the mind's eye', which itself constitutes a subclass of what Dendy calls \*phantoms or ghosts. The notion of illusive conception may be seen as a forerunner of the present-day notion of \*cognitive illusion. Dendy uses the term illusive conception in opposition to the term \*illusive perception.

#### Reference

- Dendy, W.C. (1847). *The philosophy of mystery*. New York, NY: Harper & Brothers.

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### Illusive Perception

Also known as ocular spectra. The two terms were introduced as synonyms in 1847 by the British surgeon Walter Cooper Dendy (1794–1871), denoting a subclass of 'ghosts of the mind's eye', which itself constitutes a subclass of what Dendy calls \*phantoms or ghosts. The notion of illusive perception can be seen as an equivalent of the later notion of \*personification (i.e. a \*compound hallucination depicting a human being). Dendy uses the term illusive perception in opposition to the term \*illusive conception.

**Reference**

Dendy, W.C. (1847). *The philosophy of mystery*. New York, NY: Harper & Brothers.

**Illusory Alteration of Time**

see Time distortion.

**Illusory Arm Extension**

The term illusory arm extension refers to a subclass of the \*motor illusions, which is itself a subclass of the group of \*illusory movement experiences. The phenomenon of illusory arm extension can be induced by means of vibratory stimulation of the biceps tendon of a bent and immobilized arm in a blindfolded test person. This procedure typically produces a tonic vibration reflex, followed by an illusory feeling of movement around the elbow, followed by the \*kinaesthetic illusion of extending the lower arm into extracorporeal space. A variant of the illusory arm extension is known as \*Pinocchio illusion. The mediation of both types of motor illusion is attributed to the interplay between basic sensorimotor impulses (involving patterns of alpha and gamma motoneuron activity, muscle spindle discharge level, and the resulting movements of the arm), and higher cognitive and affective processes as represented by parietal brain areas involved with bodily representations and/or representations of movement. The illusory arm extension may also be classified as a vibration-induced \*phantom illusion or as a \*body schema illusion.

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**Illusory Colours**

see Fechner's colours.

**Illusory Displacement of Limbs**

A term used to denote an illusory sensation in which a paralytic limb is perceived as being detached from the rest of the body. This phenomenon has been described in cases of hemiplegia. As noted by the British neurologist Macdonald Critchley (1900–1997), illusory displacement of paralysed limbs is associated with lesions affecting the parietal lobe. As he maintains, “The patient may entertain that one of his limbs is completely detached from his own body and occupies some position nearby or afar. Or the patient may imagine his affected limb to be moving when it is actually immobile. Such an idea may be illusory or delusional; it can occur in episodic fashion, or it can be continual.” Illusory displacement of limbs is usually classified as a variant of the group of \*body schema illusions. Conceptually as well as phenomenologically, the condition would seem to lie on a continuum with neglect, \*personification, and \*illusory movement of limbs.

**Reference**

Critchley, M. (1965). *Disorders of corporeal awareness in parietal disease*. In: *The body percept*. Edited by Wapner, S., Werner, H. New York, NY: Random House.

**Illusory Motor Movement**

see Illusory movement experience.

**Illusory Movement Experience**

Also known as illusory motor movement. Both terms refer to a hallucinated feeling of movement, such as the feeling of flying, falling, or floating, as well as elevator feelings, sensations of acceleration, and spinning sensations. Illusory movement experiences can be divided into two broad categories, i.e. \*motor illusions (charac-

terized by the illusory involvement of the muscles) and \*kinaesthetic hallucinations (without illusory involvement of the muscles). Sometimes \*autoscopy and \*out-of-body experiences are also included in the group of illusory movement experiences. When illusory movement experiences occur during sleep paralysis, they are sometimes referred to as \*hallucinoid experiences. Pathophysiologically, illusory movement experiences are linked to the proprioceptive, kinaesthetic, and vestibular subsystems of the \*perceptual system. As demonstrated in myriad experimental configurations, they can be evoked within seconds when muscle vibration is used to generate proprioceptive misinformation about limb position. Some examples of the ensuing \*phantom illusions are the \*illusory arm extension and the \*Pinocchio illusion.

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- Lackner, J.R. (1988). Some proprioceptive influences on the perceptual representation of body shape and orientation. *Brain*, 111, 281–297.

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## Illusory Movement of Limbs

Also known as \*motor illusion. Both terms are used to denote a type of \*kinaesthetic hallucination characterized by the illusory sensation of movement of one or more body parts, while these are actually at rest. As noted by the British neurologist Macdonald Critchley (1900–1997), illusory movement of paralysed limbs is associated with lesions affecting the parietal lobe. As Critchley maintains, “The patient may entertain that one of his limbs is completely detached from his own body and occupies some position nearby or afar. Or the patient may imagine his affected limb to be moving when it is actually immobile. Such

an idea may be illusory or delusional; it can occur in episodic fashion, or it can be continual.” Conceptually as well as phenomenologically, illusory movement of limbs would seem to lie on a continuum with neglect, \*personification, and \*illusory displacement of limbs.

### Reference

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## Illusory Nose Prolongation

see Pinocchio illusion.

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## Illusory Splitting

Also known as illusory vertical splitting. Both terms are used to denote a visual distortion consisting of a vertical splitting of objects, often accompanied by a vertical displacement of the two parts along the fracture line. Illusory splitting is reported largely in the context of \*migraine auras. While this type of splitting features in some of the famous paintings of women’s faces by the Spanish painter Pablo Ruiz Picasso (1881–1973), it has been suggested that Picasso may have experienced illusory splitting himself, possibly in the context of \*migraine aura without headache. Illusory splitting is commonly classified as a \*metamorphopsia, which is itself classified as a \*sensory distortion.

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## Illusory Vertical Splitting

see Illusory splitting.

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## Illusory Visual Perseveration

see Illusory visual spread.

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## Illusory Visual Spread

Also known as illusory visual perseveration. Both terms were introduced in or shortly before 1949 by the British neurologist Macdonald Critchley (1900–1997) to denote a type of \*visual perseveration characterized by the visual extension, expansion, or prolongation of a stimulus-object, “in other words, a kind of spatial perseveration of objects seen”. In illusory visual spread, objects within the visual field are often perceived as multiple copies, and neighbouring objects may appear to take on the colours and texture of these objects. Critchley illustrates the latter phenomenon as follows: “The pattern of a striped or chequered garment would seem to extend over the face of the wearer. The pattern of cretonne curtains would often seem to extend along the adjacent wall.” As to the pathophysiology of illusory visual spread, it has been suggested that the visual parietal regions may be involved in its mediation. In an etiological sense the phenomenon is associated primarily with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy, and with the use of \*hallucinogens such as LSD and mescaline. Illusory visual spread is classified by Critchley as a type of visual perseveration, which is in turn classified as a \*reduplicative phenomenon or a type of \*metamorphopsia.

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## Imagery

Also known as visual imagery. The term imagery comes from the Latin verb *imaginari*, which means to copy, to imitate, to picture. It tends to be used in a rather loose sense to denote a recollection or fantasy presenting itself as ‘a picture in the mind’ or as ‘an experience appearing in inner subjective space’. Conceptually, imagery is sometimes designated as a residual trace of sense perceptions. However, it is generally acknowledged that imagery lacks the phenomenological qualities that characterize actual \*percepts. Therefore, imagery has also been relegated to the class of symbols or nonverbal thoughts. It has been suggested that the propensity to hallucinate might be higher in individuals with vivid imagery, but this notion is insufficiently endorsed by empirical studies. Although the vividness of mental images is sometimes subjectively associated with mild hallucinatory experiences, the degree of vividness of mental images would not seem to play a major role in the mediation of hallucinations.

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## Imaginal Polyopia

The term imaginal polyopia is indebted to the Latin verb *imaginari* (to copy, to imitate, to picture) and the Greek words *polus* (much, many) and *opsis* (seeing). It was introduced in or shortly before 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to designate a special form of \*polyopia which he observed in the context of mescaline intoxication. In imaginal polyopia the perception of part of an object can give rise to the subjective sensation of seeing it in its entirety,



and the subsequent notion that multiple versions of the object exist. Klüver illustrates this phenomenon by quoting a participant in a mescaline experiment: "M. passed me on my left side. I saw nothing but a part of his cloak. Automatically it turned into the whole figure of M.; and I had now some sort of idea that a large number of M.'s moved away from me in a curved line, the M. in the foreground being the smallest one. I was unable to say whether it was a very strong image or vision; phenomenally, the many M.'s were projected into the perceived space of the dark room." Klüver uses the term imaginal polyopia in opposition to \*'objective' polyopia and \*hallucinatory polyopia.

### Reference

Klüver, H. (1966). *Mescal and Mechanisms of hallucinations*. Chicago, IL: University of Chicago Press.

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## Imaginarii

A term introduced in or shortly before 1763 by the Swedish father of modern taxonomy Carl Linnaeus (also known as Carolus Linnaeus, and Carl von Linné, 1707–1778) to denote an order of the genus *mentales* (i.e. mental diseases) characterized by disturbances of the sensory faculties (i.e. \*illusions and hallucinations).

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## Imaginary Companion

Also referred to as childhood companion and hallucinated playmate. The term imaginary companion is indebted to the Latin verb *imaginari*, which means to copy, to imitate, to picture. It has been in use at least since the late 19th century. It refers to a fictitious character created and perceived by a child. The imaginary companion was defined in 1934 by the American paediatrician Margaret Svendsen as "an invisible character, named and referred to in conversation with other persons or played with directly

for a period of time, at least several months, having an air of reality for the child but no apparent objective basis." Imaginary companions are also created and perceived by adolescents and adults, but they have been described most frequently in children aged around 4. Estimates as to the lifetime prevalence of imaginary companions range from 13.4% in Svendsen's sample to 65% in a study by the American child psychologists Dorothy and Jerome Singer. This huge difference in prevalence figures may well stem from the Singers' use of a broader definition of imaginary companions, which includes items such as stuffed animals and dolls. In effect, this led the Singers to include cases of imaginary companions proper, as well as cases more indicative of a syndrome of delusional companions (i.e. a variant of the \*misidentification syndrome). A more prudent estimate by the British child psychologists John Newson (b. 1925) and Elizabeth Newson (b. 1929) yields a prevalence of 22% in 4-year olds. However, later studies have indicated that imaginary companions may occur even more frequently in older children. Thus the British psychologists David Pearson et al. found a prevalence rate of 46.2% for imaginary companions in children between 5 and 12 years of age. Children tend to describe their imaginary companions as other children, fairy tale characters, television characters, or toy animals, all with definite sensory characteristics. They may be persistent in their demand that these companions be treated as living beings, who must be consulted before a decision can be made, or who deserve a place at the dinner table, with plates, cutlery, and all. These features would seem to hint at some type of juvenile \*hallucinatory experience, but the children involved tend to be aware of the imaginary status of their companions. In addition, many of them appear to have conscious control over them. Although admittedly arbitrary, these are the principal reasons why imaginary companions are sometimes regarded as products of fantasy rather than \*hallucinations proper. And yet they have also been referred to in the literature as 'non-pathological, developmental hallucination experiences'. A relation between imaginary companions and a later proneness to hallucinations or psychiatric disorders has never been established (see also the entry Hallucinated game). Sometimes the term imaginary companion is also used to denote a hallucinated person accompanying mountaineers and other explorers subject to isolation and stressful circumstances.

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## Imaginary Halitosis

see Hallucinatory halitosis.

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## Imaginary Playmate

see Imaginary companion.

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## Imagistic Phosphene

The term imagistic phosphene comes from the Latin noun *imago* (image) and the Greek words *phōs* (light) and *phainein* (to shine). It is used to denote a \*phosphene (i.e. a flash of light) presenting in the shape of a \*formed hallucination. Etiologically, imagistic phosphenes are associated with a variety of conditions, including migraine with \*aura, \*migraine aura without headache, the use of \*hallucinogens, \*flashback phenomena, and \*hallucinogen-induced persistent perception disorder (HPPD). It has been suggested that phosphenes occurring in the context of a migraine aura always start out as simple visual phenomena, and sometimes develop into geometric patterns, while the third stage of imagistic phosphenes (i.e. formed hallucinations) is seldom attained. At any rate, imagistic phosphenes are considered extremely rare phenomena.

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## Imperative Hallucination

Also known as command hallucination. The term imperative hallucination is indebted to the Latin verb *imperare*, which means to command. It is used to denote a variant of the \*verbal auditory hallucination, the content of which involves an incentive or command. Although less common, and underreported in the empirical literature, imperative hallucinations may also occur in the visual modality (involving a visually hallucinated written command, for example, or a command in hallucinated sign language) or in any of the other sensory modalities. Imperative hallucinations experienced in the visual modality are also referred to as \*visual command hallucinations. It is open to debate whether hallucinations consisting of a rudimentary message (such as the single word 'Yes,' or a perceived pat on the back), which are merely interpreted by the affected individual as a command (for example, "Yes, this is the person you should talk to"), should be allowed to count as imperative hallucinations proper. Reliable incidence and prevalence figures of imperative hallucinations are lacking. Among adult voice hearers with a psychiatric diagnosis, imperative hallucinations have been reported in 18–89% of cases. The perceived commands can involve anything from an invitation to perform a harmless or even beneficial act, to an instigation to physically violent behaviour.

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## Imperception for One Half of the Body

see Hemiasomatognosia.

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## Inattentional Blindness

The term inattentional blindness is indebted to the Latin words *in* (not) and *attentio* (attention, notice). It was introduced in or shortly before 1992 by the American psychologists Ariën Mack (b. 1931) and Irvin Rock (1922–1995). It is used to denote a failure to consciously perceive a fully visible, but unanticipated object or stimulus because the observer's focus of attention is elsewhere. A classic illustration of the notion of inattentional blindness was reported by the American psychologists Daniel J. Simons and Christopher F. Chabris. They asked 192 test persons to watch a video fragment in which two small groups of people were playing basketball, and to keep count of either the number of passes made by one of the teams or the number of bounce passes versus aerial passes. In different versions of the video fragment a tall woman entered the field carrying a white umbrella, or a shorter woman wearing a gorilla suit. In both versions the woman's on-screen presence lasted 5 s. Afterwards the test persons were asked whether they had noticed anything out of the ordinary taking place on the screen, and on average 46% responded in the negative. Simons and Chabris attribute this failure to detect an ongoing and highly salient, yet unexpected event to inattentiveness or 'divided attention'. Since ancient times the phenomenon itself has been used – and misused – by illusionists, stage magicians, and tricksters. In the medico-psychological literature it has been described at least since the era of mesmerism. In the 19th-century hypnotist tradition, for example, inattentiveness constitutes one of the explanatory models for the mediation of \*negative hallucinations. It has been suggested that, in a conceptual and phenomenological sense, inattentional blindness may well be similar to \*hypnotic blindness. Other related phenomena are \*inattentional deafness, \*auditory deafness, \*tactile insensitivity, and \*change blindness. The notion of inattentional blindness should not be confused with \*visual inattention.

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## Inattentional Deafness

The term inattentional deafness is indebted to the Latin words *in* (not) and *attentio* (attention, notice). It was introduced in or shortly before 1995 by the American psychologists Ariën Mack (b. 1931) and Irvin Rock (1922–1995). It is used to denote a failure to consciously perceive an above-threshold auditory stimulus because one's focus of attention is elsewhere. A typical setting in which inattentional deafness can occur is dichotic listening, i.e. where a test person is asked to listen carefully to a certain auditory stimulus, and is simultaneously presented with an unexpected, and quite different auditory stimulus, often (although not necessarily) in the unattended ear. A total unawareness of the presence of such an aberrant auditory stimulus is called \*auditory deafness. Related phenomena include \*inattentional blindness, \*tactile insensitivity, and \*change blindness.

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- 

## Incoherent Tinnitus

The term incoherent tinnitus comes from the Latin words *in* (not), *cohaerens* (coherent), and *tinnire* (to ring). It refers to a type of \*tinnitus (i.e. 'ringing in the ears') in which the sound involved is perceived in the form of two distinct stimuli rather than the single, centred, auditory percept that characterizes \*coherent tinnitus. As to its pathophysiology, incoherent tinnitus is associated primarily with peripheral (i.e. cochlear) lesions.

**Reference**

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**Incomplete Achromatopsia**

see Achromatopsia.

**Incomplete Hallucination**

The term incomplete hallucination is used to denote a hallucination that lacks one or more of the formal characteristics of the full-blown perceptual phenomenon. For example, the term is used to denote a \*visual hallucination that lacks the saturation of colour of ordinary sense perceptions or the spatial qualities of an object in the extracorporeal world. It is also used to denote an \*auditory hallucination perceived ‘inside’ the head (i.e. an \*internal auditory hallucination) or one with a ‘fake’ or artificial sound quality. The French psychiatrist Pierre Lelong conceptualizes incomplete hallucinations as dissociated or depersonalized mental elements that have not – or not yet – been turned into fully ego-alien or ego-dystonic percepts. Lelong divides the developmental process of these mental elements into three stages or degrees, which he designates as obsession (characterized by self-consciousness and anxiety), \*psychic hallucination (characterized by depersonalization and \*automatisms), and \*sensorial hallucination (characterized by its subconscious nature and an apparent objectivity). The issue of phenomenological incompleteness has traditionally been considered a favourable sign, in the sense that a ‘desensorialization’ of hallucinations tends to be interpreted as a sign of recovery, whereas their ‘re-concretization’ tends to be seen as a sign of relapse. The fact that not all the formal characteristics of \*hallucinations proper are present has led some authors to designate incomplete hallucinations as \*pseudohallucinations. The term incomplete hallucination is used in opposition to the term \*complete hallucination.

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**Incubo**

see Incubus.

**Incubus**

Also referred to as incubo, night hag, nightmare, incubus experience, and familiar. The term *incubus* is Latin for night hag or nightmare. It comes from the verb *incubare*, which means to lie upon. The term is used in demonology to denote an angel that has fallen, and in the guise of a man seeks sexual intercourse with mortal women while they are asleep. A fallen angel in the guise of a woman that likewise seeks sexual intercourse with mortal men is called a \*succubus (i.e. a demon collecting semen by causing nocturnal ejaculations). In the past many \*nightmares and sometimes even \*daymares were attributed to the interference of incubi, although strictly speaking it is more likely that the nocturnal experiences attributed to incubi were night terrors rather than nightmares. The belief in incubi is thought to have its roots in ancient times. It has been suggested that the concept itself developed out of pagan speculations about the commerce of gods with people. During the Middle Ages, the belief in incubi became assimilated with Christianity. During that time, when associated with an alleged witch or sorcerer, incubi were known as ‘familiaris’. Throughout the ages, the incubus phenomenon has been surrounded by many different hypotheses and speculations. As the French alienist Alexandre Jacques François Briere de Boismont (1797–1881) wrote in 1845, “In the present day the term incubus is usually applied to the nightmare, but formerly it referred to imaginary fiends or spectres, to whom strange powers are attributed by the writers on demoniacal agency. Many noble families were supposed to have their origin from the connexion of incubi with females, as in the well-known instance of Robert of Normandy, called *le Diable*. The succubus was a similar fiend of the female sex.” As noted by the German classical scholar Wilhelm Heinrich Roscher (1845–1923), a certain analogy would seem to exist between the



Fig. 2 Incubus. Source: Bibliothèque Nationale, Paris

incubus of classical and medieval times, and the *\*Mar* of Germanic superstition. The American psychopharmacologist Ronald K. Siegel, who is himself familiar with incubus attacks, questions the alleged sexual nature of the experience. In or shortly before 2001 the term incubus, stripped of its metaphysical connotations, was reintroduced by the Canadian psychologist and sleep researcher James Allan Cheyne. He uses the term incubus to denote a major cluster of *\*hallucinoid* experiences (i.e. somatosensory phenomena which co-occur with *\*hypnagogic* or *\*hypnopompic* hallucinations, but which are not themselves hallucinations). They occur during the

stages of *\*sleep paralysis* and are similar to those which in the classical literature are attributed to the presence or actions of an incubus. Symptoms of this cluster include bodily pressure (typically on the breast), breathing difficulties, pain, and associations with impending death. Cheyne proposes that the term incubus be used in opposition to the terms *\*intruder* and *\*illusory movement* experiences, which constitute two additional clusters of hallucinoid experiences.

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## Incubus Experience

see Incubus.

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## Indirect *Gedankenlautwerden*

The term indirect *Gedankenlautwerden* is indebted to the German term *\*Gedankenlautwerden*, which translates as thought-echo, thought echoing, thoughts-out-loud, or audible thinking. The term *Gedankenlautwerden* refers to a *\*verbal auditory hallucination (VAH)* echoing the contents of the hallucinator's conscious thoughts. The German term *indirecten Gedankenlautwerden*, however, which was introduced in or shortly before 1908 by the German neurologist and psychiatrist Kurt Goldstein (1878–1965), refers to a variant of ordinary *Gedankenlautwerden* in which the affected individual discerns his or her own thoughts in the words spoken by another person. As Goldstein explains, one may speak of indirect *Gedankenlautwerden* "when the patient perceives an external auditory percept, and hears his own thoughts in it. Here ... it is uncertain how much of this is mere false interpretation, and how much actual hearing of one's thoughts." Indirect *Gedankenlautwerden* can perhaps best be classified as a variant of *\*auditory pareidolia* or as a *\*cognitive illusion*. The underlying cognitive mechanism is sometimes referred to as *\*apophenia* (i.e. an excess of perceptual or heuristic sensitivity leading to the discernment of patterns or connections in random or otherwise meaningless data).

### Reference

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## Induced Hallucination

see Hypnotically induced hallucination.

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## Induced Motion

A term used to denote an *\*illusion of movement* that may occur when a moving and a stationary object are perceived simultaneously, and the moving object is mistakenly held to be the stationary one. The stationary object is then perceived as if it were moving in the opposite direction of the object that is actually moving. A well-known example of induced motion is the apparent movement of a train perceived through the window of a second train, which may induce the illusory sensation of one's own train moving in the opposite direction. Descriptions of induced motion date back as far as Antiquity. The Greek mathematician Euclid of Alexandria (325?–265? BC), for example, has been credited with providing an early description of the phenomenon. The German Gestalt psychologist Karl Duncker (1903–1940) is recognized as being the first modern author to study the subject extensively.

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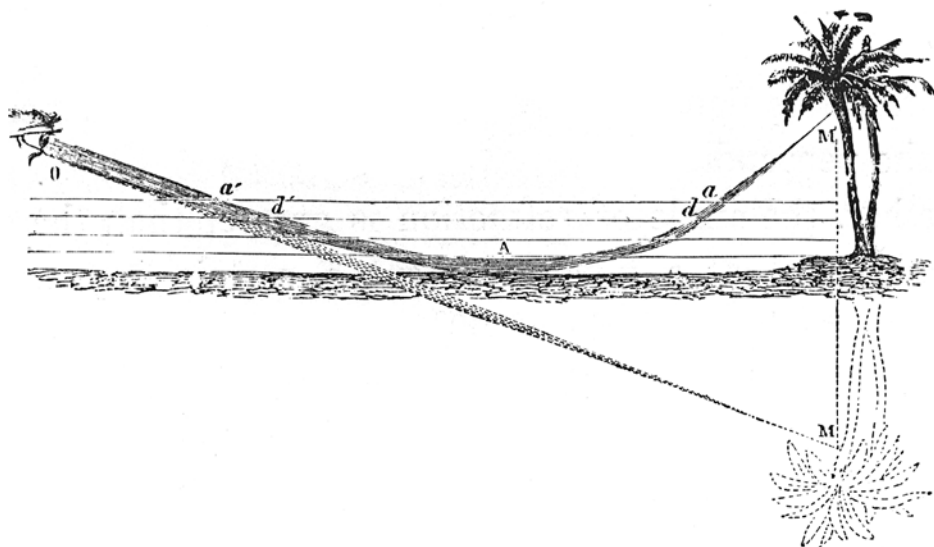
## Infants and Hallucinations

see Childhood and hallucinations.

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## Inferior Mirage

The term inferior mirage is indebted to the French verb *se mirer*, which means to reflect, or



**Fig. 3** Inferior mirage. Source: Flammarion, C. (1873). *The atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

to be reflected. The adjective inferior refers to the phenomenon's position relevant to the horizon or a distant object. The term inferior mirage is used as a generic term for a group of \*physical illusions typically depicting distant pools of water or oil or blue sky over a hot surface such as a road, a runway, or a desert, which have a relative position beneath a perceived distant object or the horizon. If the light is reflected not by the sky but by a mountain or other distant object, then that object is reflected in the miraged image. Inferior mirages tend to be classified in accordance with the nature of the surface above which they appear. Two examples of inferior mirages are the desert mirage and the \*highway mirage. The mediation of inferior mirages is attributed to differences in the refractive index of the atmosphere, which are in turn attributed to layers of cold air overlying layers of hot air, with differences in temperature between the adjacent layers of air of  $10^{\circ}\text{C}$  or more per metre. Uniform temperature gradients tend to produce undistorted images. Increasing temperature gradients, such as those of  $10^{\circ}\text{C}/\text{m}$  near the ground, and  $20^{\circ}\text{C}/\text{m}$  higher up, tend to yield inverted images. Temperature gradients of a higher complexity may yield even more complex distortions. These may be vibrat-

ing, vertically extended (i.e. 'towering'), flattened (i.e. 'stooping'), etc. The term inferior mirage is used in opposition to the terms \*superior mirage, \*double mirage, and \*lateral mirage.

#### References

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## Inhalants and Hallucinations

The term inhalant comes from the Latin verb *inhalare*, which means to breathe into. It is used to denote a group of volatile substances used for industrial purposes, and widely misused for their hallucinogenic and other psychoactive properties, especially by school children, adolescents, and other individuals who cannot afford more expensive drugs. Some examples of inhalants are aerosols, airplane glue, butane gas, cleaning fluid, gasoline, kerosene, lighter fluid, rubber cement,

and varnish remover. Inhalants are administered either through vapour inhalation (i.e. 'sniffing' or 'snorting') or by soaking a rag in a volatile substance and stuffing it in the oral cavity (i.e. 'huffing'). The method where a plastic bag or bottle is used in the process of inhalation is called 'bagging'. Some of the major substances held responsible for the mediation of hallucinations by inhalants are toluene, acetone, benzene, and halogenated hydrocarbons. The chronic use of inhalants is thought to lead to the mediation of hallucinations. The types of \*sensory deceptions and distortions evoked by inhalants tend to differ across substances. Moreover, they are dependent on dose, means of administration, other substance abuse, and individual predisposition. They may include \*metamorphopsias (such as \*micropsia and \*macropsia), \*body schema illusions (such as \*whole body macrosomatognosia and \*whole body microsomatognosia), \*illusions, changes in the intensity of colour perception, and \*visual, \*auditory, \*somatic, \*tactile, \*kinaesthetic, and \*compound hallucinations. \*Gustatory hallucinations can occur as well, but these have been reported less frequently.

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### Inhalers and Hallucinations

The term inhaler comes from the Latin verb *inhalare*, which means to breathe into. It is used to denote a fluorocarbon-driven device used in pulmonology and other branches of medicine to administer therapeutics such as beta agonists, \*steroids, and ipratropium via the lungs. As suggested in 1994 by the American pediatrician Bruce M. Schnapf and the American pharmacologist Maria L. Santeiro, the excessive use of beta-agonist inhalers can evoke vivid \*complex visual (and possibly also \*compound) hallucinations. The authors' suggestion was based on the case of an 8-year-old boy who had used excessive amounts of the beta agonist albuterol via an inhaler. According to the authors, the most likely

cause of the hallucinations was not the beta agonist, but the aerosol propellants Freon 12 (i.e. dichlorodifluoromethane) and/or Freon 11 (i.e. trichloromonofluoromethane).

#### Reference

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### Inner Heautoscopy

see Internal autoscopy.

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### Inner Language

see Inner speech.

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### Inner Speech

Also known as inner language, internalized speech, inner thought, and self-talk. All five terms are used interchangeably to denote speech spo-



Fig. 4 Lev Vygotsky



ken by oneself without vocalization (also referred to as verbal thought or 'thinking in words'). The content of inner speech is typically depicted as an argument with oneself over a course of action to be taken, a rehearsal of what one is going to say or do, or a reassurance to comfort oneself. In this reading, inner speech is conceptualized as being quite similar, grammatically as well as syntactically, to sentences actually spoken. However, inner speech has also been conceptualized as an idiosyncratic kind of shorthand for the language used in actual speech. It was in the latter sense that the term inner speech was introduced in *Myshlenie i Rech'* (commonly – although not entirely correctly – translated as *Thought and Language*), a book by the Russian developmental psychologist Lev Semenovich Vygotsky (1896–1934) which was published posthumously in 1934. Starting from the thesis that the earliest language learned by infants has a social connotation, Vygotsky argues that at a certain age this original social speech becomes divided into egocentric speech and communicative speech-for-others. He conceptualizes inner speech as a form of egocentric speech that is not only silent but also quite condensed in comparison with speech-for-others. Accordingly, he considers it as being basically unintelligible to others – if it were to be heard aloud – due to its grammatical and syntactical peculiarities. In Vygotsky's view, inner speech may be regarded as a psychological interface between culturally sanctioned symbolic systems (such as natural languages) and private thought (which in his view is not necessarily linguistic in nature). The mediation of inner speech is associated primarily with neurophysiological activity in Broca's area (i.e. the left inferior frontal region of the brain). Vygotsky's notion of inner speech played an important part in the development of the \*inner speech model for verbal auditory hallucinations, which dominated neuropsychological thinking on verbal auditory hallucinations (VAH) from the 1980s onwards. However, it was Modell's concept of \*hallucinated inner speech rather than Vygotsky's original notion of inner speech that helped to shape this explanatory model.

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## Inner Speech Model for Verbal Auditory Hallucinations

Also known as misattribution model for verbal auditory hallucinations. The two names are used interchangeably to denote a hypothetical model attributing the mediation of some types of \*verbal auditory hallucination (VAH) to a disorder of \*inner speech. The inner speech model suggests that individuals experiencing VAH are unaware of their own verbal thoughts and that they may subsequently misattribute these to an external source. Traditionally, the inner speech model comes in two variants. These are referred to as the \*input model (which attributes the mediation of VAH to disinhibited neuronal activity within \*Wernicke's speech reception area) and the \*output model (which seeks to explain the mediation of VAH by reference to disinhibited neuronal activity within Broca's speech production area). A third variant of the inner speech model, which seeks to explain the misattribution of inner speech to a default in the corollary discharge from the frontal speech production areas towards the speech perception areas, is known as the \*defective corollary discharge model for hallucinations. Conceptually, the inner speech model for VAH constitutes an elaboration of the \*bicameral mind theory of the American psychologist Julian Jaynes (1920–1997). Jaynes's theory relates the 'voices' heard by individuals in ancient cultures to the purported presence of two virtual rooms or chambers within their minds, one of which is envisaged as being involved in the mediation of verbal thoughts and the other as being involved in their reception. According to Jaynes, having a bicameral mind used to lead to the individual's perception of endogenously mediated verbal thoughts, although he was not capable of determining their endogenous origin. The inner speech model has served as the principal conceptual framework for many of the neuropsychological and imaging studies of VAH carried out from the 1980s onwards. Although these studies have succeeded in corroborating the role of the speech centres

in the mediation of VAH, a number of conceptual and empirical issues have yet to be addressed. In the version outlined above, the inner speech model would seem to be suitable as an explanatory model for the mediation of thought insertion, thought intrusion, and even \*psychomotor verbal hallucinations, which are conceptualized as being inaudible in nature. As inner speech is conceptualized as a cognitive rather than a perceptual phenomenon, and most versions of the inner speech model leave the role of the primary auditory cortex out of the equation, it is as yet unclear how inner speech – whether it originates from Broca's area or not – might be converted into a perceptual phenomenon such as a VAH. (A hypothetical model designed to explain this conversion is known as the \*perceptualization of the concept.) If it were possible to settle this issue to universal satisfaction, the inner speech model might also serve as an explanatory model for the mediation of \**Gedankenlautwerden*. But it would still be something of a challenge to imagine how inner speech might contribute to the mediation of other types of VAH, which are generally perceived as spoken in the voice of a third person, or how they might contribute to the mediation of various voices speaking simultaneously or a voice speaking in a foreign language not mastered by the affected individual. Given the fact that inner speech was originally conceptualized by Vygotsky as a psychological interface between culturally sanctioned symbolic systems (such as natural languages) and one's own private thought, it is not easy to envisage its role in the mediation of VAH consisting of 'foreign' voices. Thus it would seem that inner speech models for verbal auditory hallucinations tend to be based only loosely on Vygotsky's original notion of inner speech. Instead, they would seem to go back to a slightly broader notion, introduced in 1958 by the American psychiatrist and psychoanalyst Arnold H. Modell (b.1924) and referred to as \*hallucinated inner speech. Modell envisages the notion of hallucinated inner speech as a type of inner speech involving not only the ego's verbal thoughts but also the verbal utterances of internalized objects. In Modell's own words, "The voices are identified as formerly loved persons, principally the parents, who in some unexplained way are fused to the self. These voice objects function as parents in terms of giving advice and being a source of prohibitions, and also in gratifying wishes stemming from all stages of infantile development." For a comparison of the respective

notions formulated by Vygotsky and Modell, see the entries Inner speech and Hallucinated inner speech.

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### Inner Thought

see Inner speech.

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### Input Model of Hallucinatory Activity

In hallucinations research the term input model is used as a generic term for a group of explanatory models which stress the contribution of information-perception areas in the mediation of hallucinations. The term input model derives from a general information processing model known as the input–output model. This model is conceptualized as a set of rules or laws describing a fixed sequence of preset operations that determine a circuit's output for any given type of input. Proceeding on the assumption that \*verbal auditory hallucinations (VAH) can be mediated by any part of the so-called inner voice-inner ear circuit, input models of verbal auditory hallucinatory activity emphasize the part played by Wernicke's area (i.e. the speech perception area), as well as the effect of exogenous information upon Wernicke's area. In this context, output models

emphasize the role of Broca's area (i.e. the speech production area).

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two or more epileptic seizures. This experience may take the form of a \*religious hallucination or illusion, but this is not necessarily the case. The term interictal religious experience is used in opposition to the terms \*ictal religious experience and \*postictal religious experience.

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## Insect Hallucination

see Formicative hallucination.

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## Insect Vision

see Entomopia.

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## Intellectual Aura

The term intellectual aura comes from the Latin words *intellectus* (understanding, reason) and *aura* (wind, breeze, smell). The term *aura intellectuelle* was introduced in or shortly before 1860 by the French psychiatrist Jean Pierre Falret (1794–1870) to denote hallucinations and other complex mental warning symptoms preceding an epileptic seizure. In 1876 the term was reintroduced in the form of intellectual aura by the British neurologist John Hughlings Jackson (1835–1911). In 1879 Jackson replaced the term by the somewhat paradoxical expression \*dreamy state.

### Reference

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## Interictal Religious Experience

The term interictal religious experience is indebted to the Latin words *inter* (in between) and *ictus* (thrust, blow). It is used to denote a religious experience taking place in between

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## Intermetamorphosis Syndrome

The term intermetamorphosis syndrome is indebted to the Latin *inter* (between) and the Greek *metamorphoun* (to change one's shape). It is used to denote a subgroup of the \*misidentification syndrome which is characterized by the conviction that certain individuals have been transformed – both physically and psychologically – into other individuals. The term intermetamorphosis was introduced in or shortly before 1932 by the French psychiatrists Paul Courbon (1879–1958) and Jean Marie Tusques (1909–1983). However, as early as 1885 the Russian psychiatrist Victor Kandinsky (1849–1889) had already described the phenomenon under the German name *Personenverwechslung* (which translates loosely as 'mistaken identity'). Kandinsky used the expression to denote the consistent misidentification of a person (i.e. as their son or wife, for example), even when the individual is confronted with the real son or wife. Moreover, Kandinsky had noted that affected individuals would transpose their incorrigible conviction to a different person when the first would disappear out of their lives. He came to the conclusion that this kind of mistaken identity must be based on something more than mere delusion, i.e. on illusory perception. As a consequence, he classified *Personenverwechslung* as a third subclass of the group of \*illusions, in addition to the subclasses designated by the French alienist Jean-Etienne Dominique Esquirol (1772–1840) as \*illusions of the senses and \*ganglionic illusions. In an attempt to explain the mediation of cases of *Personenverwechslung*, Kandinsky appealed to what he called \*delirium of the senses, a variant of what is generally known as \*pareidolia. As he explained in Gestaltist fashion *avant la lettre*, "Delirium of the senses is an external state of

affairs, and mostly a singular, highly specific one, that calls forth the percept at hand. Should we not assume that the images of the individual persons that call forth these cases of mistaken identity correspond in various characteristic ways with the images of the true persons? And that that is why the complete, objective image and the schematic, subjective image fall into the same place, and why the mistake is thus called forth by an event that belongs to the process of sense perception?" Conceptually and phenomenologically, the intermetamorphosis syndrome is related to \*Frégoli's phenomenon, which is characterized by the conviction that a persecutor may take on successive identities and that he or she may appear at once as a family member, a neighbour, a stranger passed in the street, a doctor, etc.

### References

- Courbon, P., Tusques, J. (1932). Illusions d'intermétamorphose et de charme. *Annales Médico-psychologiques*, 90, 401–406.
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## Internal Auditory Hallucination

A term used to denote an \*auditory hallucination experienced as originating in one's head. Phenomenologically, internal auditory hallucinations can be likened to the sound one experiences while using a set of well-balanced headphones. Their perceptual nature distinguishes internal auditory hallucinations from cognitive phenomena such as obsessional thoughts, thought insertion, and auditory imagery. The term internal auditory hallucination is used in opposition to the term \*external auditory hallucination. The notion of the differential significance of internal versus external auditory hallucinations for the severity of the pathology, suggested by no less an authority than the German psychiatrist and philosopher Karl Jaspers (1883–1969), has now been discarded. The British psychiatrists David Copolov et al. suggest that the clarity and distinctness of auditory hallucinations have a greater impact on the 'realness' of voices than their subjective localization inside or outside the head. However, it is not unthinkable that the two types of auditory hallucination differ somewhat with regard

to their neurophysiological correlates. A phenomenological study by the American psychiatrists Ralph Hoffman et al. found that even individuals who experience internal auditory hallucinations generally identify a specific spatial location within the head, especially near or behind an ear. This finding would seem to imply the involvement of the neural apparatus dedicated to the localization of sounds in space even in cases of so-called internal voices.

### References

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- Hoffman, R.E., Varanko, M., Gilmore, J., Mishara, A.L. (2008). Experiential features used by patients with schizophrenia to differentiate 'voices' from ordinary verbal thought. *Psychological Medicine*, 38, 1167–1176.
- Jaspers, K. (1997). *General psychopathology. Volume 1*. Translated by Hoenig, J., Hamilton, M.W. Baltimore, MA: Johns Hopkins University Press.

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## Internal Autoscopy

Also known as internal heautoscopy, inner heautoscopy, organic auto-representation, and \*auto-representative phenomenon. The term internal autoscopy was introduced in or shortly before 1903 by the French physician and psychologist Paul Auguste Sollier (1861–1933) to denote a type of \*autoscopy (i.e. 'seeing oneself') in which the body's internal organs are perceived in the form of a \*visual hallucination. Such hallucinations may manifest themselves in three different ways. They are either seen as a projection into extracorporeal space, as an image that is perceived as emanating 'from within', or as an image as if seen from outside, as in \*out-of-body experiences (OBE). During an episode of internal autoscopy the affected individual think he is able to describe the size, structure, position, and functional activity of his bodily organs. The phenomenon was first described in the context of magnetism and hypnotism. At the time, it was associated primarily with hysteria. Sollier

uses the term internal autoscopia in opposition to \*external autoscopia (characterized by a visual or \*compound hallucination depicting the body's exterior features). Sollier classifies both internal and external \*autoscopical hallucinations as \*coenesthetic hallucinations.

### References

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- Denning, T.R., Berrios, G.E. (1994). Autoscopical phenomena. *British Journal of Psychiatry*, 165, 808–817.
- Sollier, P. (1903). *Les phénomènes d'autoscopie*. Paris: Félix Alcan.

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### Internal Heautoscopia

see Internal autoscopia.

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### Internalized Speech

see Inner speech.

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### Interpretive Illusion

see Psychical illusion.

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### Intersensorial Hallucination

see Compound hallucination.

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### Intervoice

Intervoice is the name of an international online community dedicated to sharing information about the work on the meaning of voices.

### Reference

<http://www.intervoiceonline.org>

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### Intrinsic Olfactory Hallucination

Also known as bodily hallucinated smell. The term intrinsic olfactory hallucination is indebted to the Latin words *intrinsicus* (within, on the inside) and *ol(e)facere* (to smell). It was introduced in or shortly before 1971 by the Canadian neurologist William E.M. Pryse-Phillips to denote an \*olfactory hallucination (i.e. a hallucination of smell) which the affected individual believes to be emanating from his or her own body, without the intervention of any outside agency. The term \*olfactory reference syndrome is used when there is no insight into the hallucinatory nature of the foul odour, and the affected individual develops delusions of reference on the basis of this symptom. The term intrinsic olfactory hallucination is used in opposition to \*extrinsic olfactory hallucination (i.e. an olfactory hallucination attributed to an extracorporeal source).

### Reference

- Pryse-Phillips, W. (1971). An olfactory reference syndrome. *Acta Psychiatrica Scandinavica*, 47, 484–509.

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### Intruder

Also referred to as intruder experience. The term intruder comes from the Latin verb *intrudere*, which means to penetrate into. It was proposed by the Canadian psychologist and sleep researcher James Allan Cheyne to denote a major cluster of \*hallucinoid experiences emerging from factor-analytic studies of the \*nightmare. According to Cheyne, the cluster he calls intruder is characterized by a numinous sense of presence, followed or accompanied by symptoms such as \*visual hallucinations, \*auditory hallucinations, \*tactile hallucinations, and feelings of anxiety. He uses the term intruder in opposition to the terms \*incubus and \*illusory movement experiences.

### Reference

- Cheyne, J.A. (2001). The ominous numinous. Sensed presence and 'other' hallucinations. *Journal of Consciousness Studies*, 8, 133–150.

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## Intruder Experience

see Intruder.

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## Intruder Hallucination

see Sensed presence.

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## Intuitive Hallucination

The term intuitive hallucination is indebted to the Latin noun *intuitus*, which means sight, 'the looking at'. It was used, and possibly also introduced, by the 19th-century French dream researcher Maurice Macario to denote a hallucination not attributable to a malfunctioning of the perceptual system, but to 'mental' or 'intellectual' preoccupations. As such, intuitive hallucinations would seem to fit into the class of \*centrifugal hallucinations. Macario uses the term intuitive hallucination in opposition to \*sensorial hallucination, \*ganglionic hallucination, and \*sthenic hallucination.

### Reference

Macario, M. (1846). Des rêves considérés sous le rapport physiologique et pathologique. *Annales Médico-psychologiques*, VIII, 170–218.

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## Inverted Vision

Also known as reversal of vision metamorphopsia. The term inverted vision comes from the Latin words *inverto* (to turn around, to change) and *visio* (seeing). It is used to denote a rare visual phenomenon in which objects of fixation, and sometimes the entire extracorporeal environment, are perceived as if rotated (commonly around 90°, sometimes 180°). The British physician and alienist Forbes Benignus Winslow (1810–1874) has been credited with having described the first case of inverted vision in 1868, in an individual he had diagnosed with hysteria. Since then, just over 30 cases have been reported in the literature. Inverted vision is perceived mainly in the coronal plane, but it can also be perceived in the sagittal or transverse plane. The phenomenon tends to be transient, sudden, and paroxysmal in nature, with a duration of the order

of several hours, occasionally days or weeks. It tends to be accompanied by vertigo, nausea, and vomiting. The neurobiological correlates of inverted vision are largely unclear. The condition has been reported predominantly in individuals with occipito-parietal lesions that spare the optic radiations, and in association with brainstem pathology. Etiologically, it is associated with a variety of conditions, including head trauma, neoplasms, stroke, and vertebrobasilar transient ischemic attack. Inverted vision is classified as a \*metamorphopsia. It should not be confused with \*visual allachaesthesia, which consists of a \*visual illusion in which objects present in one hemifield are perceived as if present in the opposite hemifield.

### References

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- River, Y., Ben Hur, T., Steiner, I. (1998). Reversal of vision metamorphopsia: Clinical and anatomical characteristics. *Archives of Neurology*, 55, 1362–1368.
- Wilder, J. (1928). Ueber Schief- und Verkehrtsehen. *Deutsche Zeitschrift für Nervenheilkunde*, 104, 222–256.
- Winslow, F. (1868). *On obscure diseases of the brain and disorders of the mind. Fourth edition*. London: John Churchill & Sons.

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## Irremembrance

see Charcot-Wilbrand syndrome (CWS).

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## Irritative Form of Hallucinatory Activity

A term introduced in or shortly before 1973 by the American ophthalmologist David Glendenning Cogan (1908–1993) to denote a type of hallucinatory activity attributable to epileptiform (i.e. 'irritative') activity within the CNS. The ensuing hallucinations are referred to as \*focal hallucinations. Cogan opposes the irritative form of hallucinatory activity to the \*release form, in which hallucinations are designated as perceptual material released from 'lower' cerebral loci.

### Reference

- Cogan, D.G. (1973). Visual hallucinations as release phenomena. *Albrecht von Graefes Archiv für Klinische und Experimentelle Ophthalmologie*, 188, 139–150.

## Isakower Phenomenon

The eponym Isakower phenomenon refers to the Austrian-American psychiatrist and psychoanalyst Otto Isakower (1899–1972), who in 1938 published a study, based in part on an autoreport, of compound \*hypnagogic phenomena reminiscent of the very earliest sensory history of the child, notably nursing at the breast. These hypnagogic phenomena include the sensation of a shrinking, or – more often – a swelling of the hands or other body parts, as well as the sensation of having something dry, crumpled, or sandy on the skin or inside the oral cavity. These phenomena may be accompanied by a sensation of floating, or of derealization or depersonalization. As Isakower observed, “The state in question. . . is one in which sensations very different from those of waking life are experienced in certain regions of the body and conveyed to the subject by more than one of his senses. The principal bodily regions concerned are the mouth, the skin and the hand. In many cases there are, as well, distinct sensations of floating, sinking and giddiness. . . Most striking of all is the blurring of the distinction between quite different regions of the body, e.g. between mouth and skin, and also between what is internal and what is external, the body and the outside world. We note too the amorphous character of the impressions conveyed by the sense-organs. The visual impression is that of something shadowy and indefinite, generally felt to be ‘round’, which comes nearer and nearer, swells to a gigantic size and threatens to crush the subject. It then gradually becomes smaller and shrinks up to nothing. Sometimes there is fire somewhere in the room. The auditory impression is of a humming, rustling, babbling, murmuring, or of an unintelligible monotonous speech. The tactile sensation is of something crumpled, jagged, sandy or dry, and is experienced in the mouth and at the same time on the skin of the whole body. Or else the subject feels enveloped by it or knows that it is close at hand. Sometimes it feels as if there were a soft yielding mass in his mouth, but at the same time he knows that it is outside him.” The symptoms described by Isakower would seem to occur most frequently during childhood and puberty. However, they can also occur during febrile or toxic states, and during psychoanalytic sessions. Although the phenomenon is considered quite common, there are only a few case reports. Isakower suggested certain parallels with \*aurae preceding an epilep-

tic seizure, and with phenomena such as *déjà vu* and *déjà vécu*. Nevertheless, he conjectured that the phenomena in question may well represent a revival of very early ego-attitudes, not necessarily related in a pathophysiological sense to focal epileptic seizures. The Isakower phenomenon is sometimes classified as a variant of the \*blank hallucination.

## References

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## Isolation Experiments

see Sensory deprivation experiments.

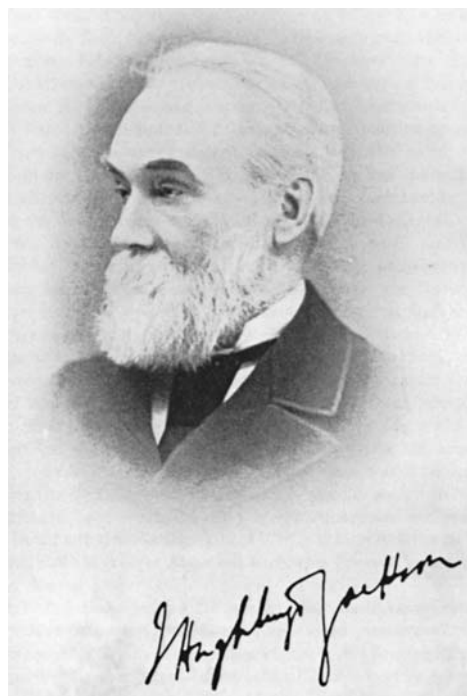


Fig. 5 John Hughlings-Jackson

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# J

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## Jackson's Law

The eponym Jackson's law refers to the British neurologist John Hughlings-Jackson (1835–1911). It involves the notion that a loss of mental functions due to disease retraces in reverse order the evolutionary development of the brain. Jackson hypothesizes that the loss of 'higher' cerebral functions may be brought about by a retrograde evolutionary process called dissolution. The concomitant loss of normal functioning is referred to by him as 'negative symptomatology' and the release of phenomena from the brain's more 'primitive' centres as 'positive symptomatology'. Thus he argues that hallucinations and other positive symptoms might well originate from the *normal* activity of the brain's 'lower' (i.e. evolutionary 'older') centres. Jackson's law proved an eminent source of inspiration for the \*perceptual release theory and for related hypothetical models for the mediation of hallucinations.

### Reference

Hughlings-Jackson, J. (1888). Remarks on evolution and dissolution of the nervous system. *American Journal of Psychology*, 1, 336–338.

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## *Jamais Vu*

*Jamais vu* is French for 'never seen'. It is used in a narrow sense to denote a transient feeling of unfamiliarity or alienation that may accompany a visual percept that had actually been experienced before. In a broader sense, it is used to denote a transient feeling of unfamiliarity or alienation accompanying any type of percept experienced before. Or, in the words of the South African *déjà vu* expert Vernon M. Nepepe, "Any subjectively inappropriate impression of non-familiarity of the present despite numerous past exposures". Some variants of *jamais vu* are *jamais vécu* (never lived), *jamais entendu* (never heard), and *jamais raconté* (never recounted). As to its pathophysiology, *jamais vu* tends to be associated primarily with focal epileptic seizures affecting the temporal lobe and/or limbic system. However, it has also been suggested that *jamais vu* can occur in the context of cannabis use, hypnosis, \*psychoanalysis, and perhaps physiologically in the absence of any of these peculiar circumstances. Conceptually, *jamais vu* constitutes the counterpart of \**déjà vu*. Like *déjà vu*, it is generally considered a mnemonic rather than a perceptual event. As a consequence, it tends to be classified as one of the paramnesias.

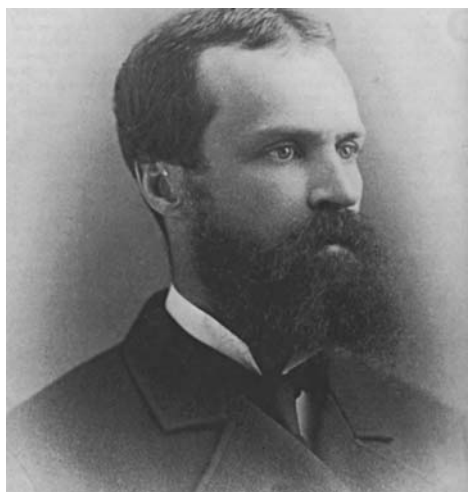


**Reference**

Neppe, V.M. (1983). *The psychology of déjà vu. Have I been here before?* Johannesburg: Witwatersrand University Press.

**James's Definition of Hallucinations**

In 1890 the American psychologist and philosopher William James (1842–1910) defined hallucinations as follows: “*An hallucination is a strictly sensational form of consciousness, as good and true a sensation as if there were a real object there. The object happens not to be there, that is all.*”



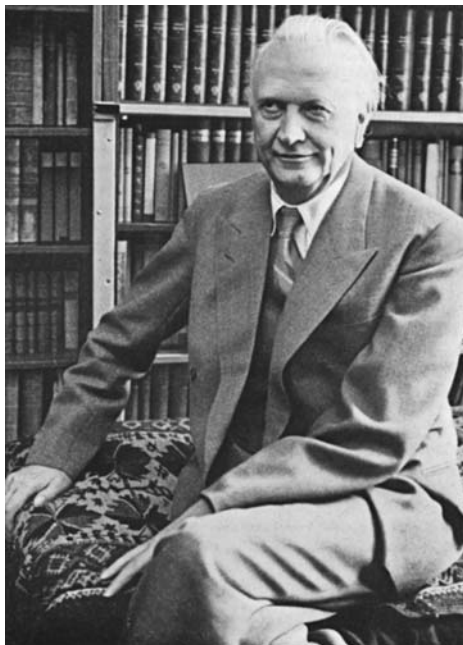
**Fig. 1** William James

**Reference**

James, W. (1952). *The principles of psychology. Great books of the western world no. 53.* Edited by Hutchins, R.M. London: Encyclopaedia Britannica.

**Jaspers's Definition of Illusions and Hallucinations**

In 1913 the German psychiatrist and philosopher Karl Jaspers (1883–1969) defined illusions and



**Fig. 2** Karl Jaspers. Photograph by Foto Claire Roessiger, Basel

hallucinations as follows: “*Illusion is the term for perceptions which in fact are transpositions (or distortions) of real perceptions; here external sensory stimuli unite with certain transposing (or distorting) elements so that in the end we cannot differentiate the one from the other. Hallucinations are perceptions that spring into being in a primary way and are not transpositions or distortions, of any genuine perception.*”

**Reference**

Jaspers, K. (1997). *General psychopathology. Volume 1.* Translated by Hoenig, J., Hamilton, M.W. Baltimore, MA: Johns Hopkins University Press.

**Jastrow's Duck–Rabbit**

Also referred to as duck–rabbit, rabbit–duck, Jastrow's duck–rabbit illusion, and rabbit–duck illusion. The eponym Jastrow's duck–rabbit refers to the Polish-American psychologist Joseph

Jastrow (1863–1944), who in 1899 published a drawing depicting an ambiguous figure that can be interpreted either as a duck or a rabbit. Jastrow used the drawing to illustrate the notion that sense perception depends on perceptual stimuli as well as mental activity. Jastrow's duck-rabbit is designated as an ambiguous, or reversible, or bistable figure. It has been argued that it is not an \*illusion proper, on the grounds that it does not operate primarily on the brain's (or mind's) unconscious inferences about the external environment, but on expectations, knowledge, and the direction of attention. Nevertheless, Jastrow's duck-rabbit tends to be classified as a \*cognitive illusion, or, more specifically, an \*ambiguous illusion. In the past, it has been erroneously assumed that the duck-rabbit was borrowed from a popular German weekly called *Fliegende Blätter* and introduced into the scientific discourse by the Austrian philosopher Ludwig Wittgenstein (1889–1951). However, Wittgenstein himself recognized Jastrow as the duck-rabbit's original creator.



Fig. 3 Joseph Jastrow

#### References

- Brugger, P. (1999). One hundred years of an ambiguous figure: Happy birthday, duck/ rabbit! *Perceptual & Motor Skills*, 89(3 Pt 1), 973–977.

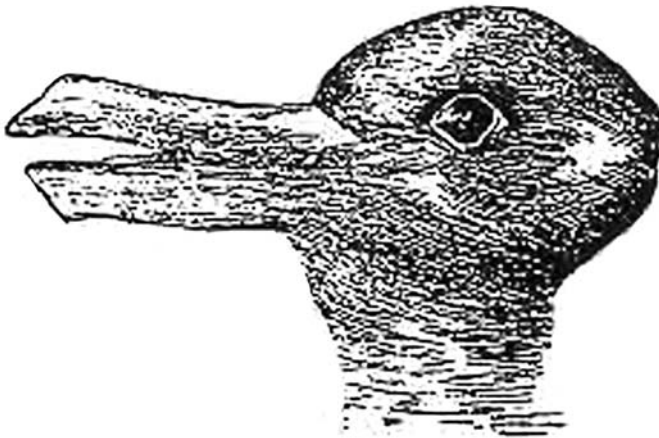


Fig. 4 Jastrow's duck-rabbit

Gregory, R.L., Gombrich, E.H., eds. (1973). *Illusion in nature and art*. London: Gerald Duckworth & Company.

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### Jeanne d'Arc

see Joan of Arc.

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### Jeanne la Pucelle

see Joan of Arc.

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### Jehanne

see Joan of Arc.

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### Jehanne d'Arc

see Joan of Arc.

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### Jenner's Definition of Hallucinations

In 2006 the Dutch hallucination expert Jack A. Jenner defined hallucinations as follows: "Hallucinations are sensory perceptions without an object, without a demonstrable external stimulus."

#### Reference

Jenner, J.A., ed. (2006). *Hallucinaties. Kenmerken, verklaringen, behandeling*. Assen: Van Gorcum.

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### Jin

see *Djinn*.

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### Jinn

see *Djinn*.

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### Joan of Arc (1412–1431)

Joan of Arc, whose real name was Jehanne, is also known as Jehanne d'Arc, Jeanne d'Arc, Jeanne la Pucelle (i.e. 'the virgin'), and the Maid of Orleans. She is revered as a Catholic Saint and the heroine of France, who led the French army to a series of important victories over the English during the 100 Years' War. Joan of Arc claimed divine guidance, in the form of voices and \*visions. Her successes were spectacular but short-lived. In the end she was captured by the English, and burned at the stake at the age of 19. Most of what is known about the nature of her voices and visions is based on the transcript of the English condemnation trial. It has been suggested that Joan experienced \*verbal auditory hallucinations from the age of 13 onwards. These consisted of voices which she initially attributed to God and later to an angel and various saints as well. The voices were accompanied by a bright light which shone from the direction of their apparent source or by visions of the saints surrounded by angels. The trial transcript also includes Joan's testimony that she had embraced the saints and even smelled them. The French alienist Alexandre Jacques François Brierre de Boismont (1797–1881) maintains that "Hallucinations of all the senses are evident in this case." Others have questioned the accuracy of the trial transcripts as regards the references to Joan's hallucinations. However, there is general consensus that she did experience \*auditory and \*visual hallucinations. Post hoc biomedical speculations on the origin of Joan's hallucinations have yielded a differential diagnosis which includes \*aural phenomena occurring in the context of a paroxysmal neurological disorder such as epilepsy or migraine, \*schizophrenia, and \*tuberculosis. However, none of these hypothetical illnesses would seem to be compatible with her rigorous lifestyle, her cognitive functioning, and her military and strategic achievements.

#### References

- Brierre de Boismont, A. (1859). *On hallucinations. A history and explanation of apparitions, visions, dreams, ecstasy, magnetism, and somnambulism*. Translated by Hulme, R.T. London: Henry Renshaw.
- Ireland, W.W. (1883). On the character and hallucinations of Joan of Arc. *Journal of Mental Science*, 29, 18–26.

Smith, D.B. (2007). *Muses, madmen, and prophets. Hearing voices and the borders of sanity.* London: Penguin Books.

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### Johnson's Definition of Hallucinations

In 1978 the American neuroanatomist Fred H. Johnson defined hallucinations as follows: "In essence, hallucinations are just subjective covert conversations, rather than objective overt talking, and they at times need not be seen as abnormal, or, for that matter, as of much interest to anyone."

#### Reference

Johnson, F.H. (1978). *The anatomy of hallucinations.* Chicago, IL: Nelson-Hall.

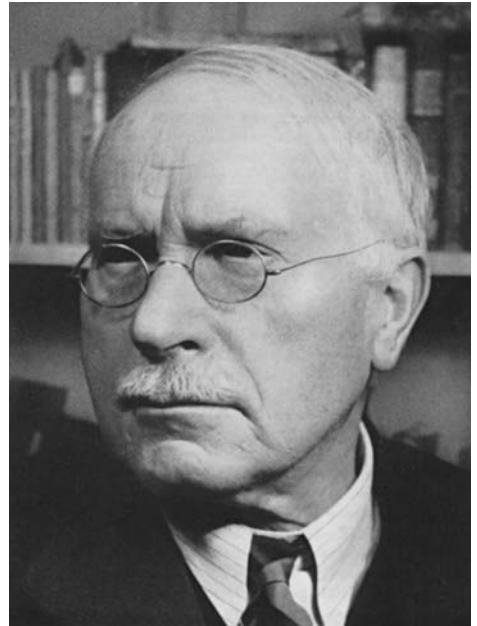
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### Jung, Carl Gustav (1875–1961)

A Swiss psychiatrist who during his adult life experienced many \*visual, \*auditory, and \*compound hallucinations. Jung attributed many of these hallucinations to supernatural causes, while others were interpreted by him as outward projections of subconscious or unconscious material. Regarding an important \*personification known to him as Philemon, he wrote, "At times he seemed almost physically real. I walked up and down the garden with him, and he was to me what Indians call a guru. . . I could have wished for nothing better than a real, three-dimensional guru, a man with great intellect and ability who would have decoded for me the involuntary creations of my fantasy."

#### References

Hayman, R. (1999). *A life of Jung.* London: Bloomsbury.  
 Jung, C.G. (1963). *Memories, dreams, reflections.* Translated by Winston, R., Winston, C. Edited by Jaffé, A. London: Routledge & Kegan Paul.



**Fig. 5** Carl Jung. Photograph by ATP Bilderdienst, Zürich

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### Jung's Definition of Hallucinations

In 1907 the Swiss psychiatrist Carl Gustav Jung (1875–1961) defined hallucinations as follows: "*Hallucination* is simply the outward projection of psychic elements."

#### Reference

Jung, C.G. (1907). *The psychology of dementia praecox.* In: *C.G. Jung. The collected works. Volume three. The psychogenesis of mental disease.* (1977). Translated by Hull, R.F.C. Edited by Read, H., Fordham, M., Adler, G. London: Routledge & Kegan Paul.

# K

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## Kakopsia

The term kalopsia comes from the Greek words *kakos* (bad, unpleasant) and *opsis* (seeing). It is used to denote a negative affective connotation of sensory, illusory, and hallucinatory phenomena, in the sense that these are perceived as ugly, sinister, and/or menacing. The term kakopsia is used in opposition to \*kalopsia (i.e. seeing things as beautiful, friendly, and/or comforting).

### Reference

Critchley, M. (1949). Metamorphopsia of central origin. *Transactions of the Ophthalmologic Society of the UK*, 69, 111–121.

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## Kalopsia

The term kalopsia comes from the Greek words *kalos* (beautiful) and *opsis* (seeing). It is used to denote the aesthetic overrating of sensory, illusory, and hallucinatory phenomena, in the sense that these are perceived as beautiful, friendly, and/or comforting. As indicated by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979), the \*geometric hallucinations occurring in the context of mescaline intoxication tend to be quite indiscriminately described as beautiful. It is this kind of indiscriminate positive valuation which is covered by the term kalopsia. The term is used in

opposition to \*kakopsia (i.e. seeing things as ugly, sinister, and/or menacing).

### References

- Critchley, M. (1939). Visual and auditory hallucinations. *British Medical Journal*, 2, 634–639.
- Critchley, M. (1949). Metamorphopsia of central origin. *Transactions of the Ophthalmologic Society of the UK*, 69, 111–121.
- Klüver, H. (1966). *Mescal and Mechanisms of hallucinations*. Chicago, IL: University of Chicago Press.

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## Kandinsky, Victor (1849–1889)

A Russian psychiatrist known for his many contributions to hallucinations research, who was himself admitted to a psychiatric hospital on various occasions while experiencing \*visual hallucinations. Kandinsky was diagnosed as suffering from melancholia, but he himself was of the opinion that his diagnosis should have been 'primary insanity'. In later years, he changed his own diagnosis to \*paranoia hallucinatoria. Victor Kandinsky was the cousin of the famous expressionist painter Wassily Kandinsky (1866–1944), who may himself have been familiar with \*synaesthesias. The import of Victor Kandinsky's work for hallucinations research lies in the combination of his first-hand acquaintance with hallucinatory phenomena, and his exceptional talent for verbalizing and analysing his experiences.

J.D. Blom, *A Dictionary of Hallucinations*,

DOI 10.1007/978-1-4419-1223-7\_11, © Springer Science+Business Media, LLC 2010

This combination places him in a league with other hallucinating intellectuals, such as Daniel Paul Schreber (1842–1911), John Thomas Perceval (1803–1876), Christoph Friedrich Nicolai (1733–1811), Vaslav Nijinsky (1889–1950), Guy de Maupassant (1850–1893), Fjodor Dostoevsky (1821–1881), and Ludwig Staudenmaier (1865–1933).

### References

- Kandinsky, V. (1881). Zur Lehre von den Halluzinationen. *Archiv für Psychiatrie und Nervenkrankheiten*, 11, 453–464.
- Kandinsky, V. (1885). *Kritische und klinische Betrachtungen im Gebiete der Sinnestäuschungen. Erste und zweite Studie*. Berlin: Verlag von Friedländer und Sohn.
- Lerner, V., Witztum, E. (2003). Victor Kandinsky, MD: Psychiatrist, researcher and patient. *History of Psychiatry*, 14, 103–111.

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### Kandinsky, Wassily (1866–1944)

A Russian expressionist painter and a cousin of the psychiatrist Victor Kandinsky (1849–1889). It has been suggested that Wassily Kandinsky was familiar with \*synaesthesias and may have made use of them in his quest for abstraction in painting. Others have argued that Kandinsky was merely striving to imbue his work with a synaesthetic quality, in conformity with his goal of creating a *Gesamtkunstwerk* (i.e. a work of total art).

### References

- Harrison, J. (2001). *Synaesthesia. The strangest thing*. Oxford: Oxford University Press.
- Kandinsky, W. (1982). *Complete writings on art. Volumes 1 and 2*. Translated and edited by Lindsay, K.C., Vergo, P. Boston, MA: G.K. Hall & Co.

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### Kandinsky's Definition of Hallucinations

In 1881 the Russian psychiatrist Victor Kandinsky (1849–1889) defined hallucinations as “the stimulation of central perceptual areas, independently of direct exogenous impressions, as a result of which a perceptual image

is created which, despite its subjective origin, renders the same impression of objectivity (liveliness) or realness within the consciousness of the person at hand that in ordinary circumstances accompanies the perceptual images of direct, objective perception.”

### Reference

- Kandinsky, V. (1881). Zur Lehre von den Halluzinationen. *Archiv für Psychiatrie und Nervenkrankheiten*, 11, 453–464.

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### Kanner's Definition of Hallucinations

In 1935 the Austrian-American child psychiatrist Leo Kanner (1894–1981) defined hallucinations as follows: “Hallucinations are sensory impressions without external stimulation. There is no outward source for the imagined voices, visions, odors, tastes, or tactile sensations.”

### Reference

- Kanner, L. (1935). *Child psychiatry*. Springfield, IL: Charles C. Thomas.

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### Kava-Induced Hallucination

*Kava* is Polynesian for bitter, pungent, sour, sourish. The name is used to denote a drink with allegedly mild \*hallucinogenic properties which is brewed from the root, leaves, and stem of *Piper methysticum*, a pepper plant from the Piperaceae family which is indigenous to Polynesia, Micronesia, and Melanesia. Kava is considered the most important psychoactive substance in these regions. Its psychoactive constituents are believed to be kavalactone and other substances belonging to the group of the kavapyrones. In Oceania kava has been used as an \*entheogen since ancient times as part of a social-status ritual. The use of high doses of kava is not without risk, in view of reports in the literature of kava-induced chronic liver cirrhosis, acute hepatitis, and acute liver failure, in some cases requiring a liver transplantation. But kava in lower doses is a common beverage on many South Sea islands, comparable to tea or coffee. In the older literature kava is reported to have significant hallucino-



Fig. 1 Frontispiece of *Yellow Sound*, a stage composition by Wassily Kandinsky (1912)

genic powers, resulting in \*scenic hallucinations, erotic \*visions, and \*kinaesthetic hallucinations (notably the illusory feeling of flying). However, today these effects are generally attributed to the additives reportedly used in earlier kava rituals. Kava is now regarded as a substance with predominantly sedative and anaesthetic properties, comparable to a mild variant of cannabis.

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#### Khat-Induced Hallucination

see Qat-induced hallucination.

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#### Kinaesthetic Aftereffect

The term kinaesthetic aftereffect is indebted to the Greek words *kinēsis* (movement) and *aisthēsis* (feeling). It refers to an illusory movement-related experience which is influenced by an actual movement. An example of the kinaesthetic aftereffect is a contrast illusion induced by lifting a relatively light weight after having lifted a heavier weight, due to which the lighter weight will appear disproportionately lighter. Another example involves the ongoing rolling sensation experienced by sailors after disembarking. During the 1960s it was suggested that the kinaesthetic aftereffect can be used as a general psychometric mea-

sure known as the personality index. This idea was abandoned during the 1970s because of the poor retest reliability and intermittent validity of the so-called kinaesthetic aftereffect task. The kinaesthetic aftereffect is usually classified as a \*physiological illusion.

### References

- Baker, A.H., Mishara, B.L., Kostin, I.W., Parker, L. (1976). Kinesthetic aftereffect and personality: A case study of issues involved in construct validation. *Journal of Personality and Social Psychology*, 34, 1–13.
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## Kinaesthetic Hallucination

Also known as kinesthetic hallucination, kinaesthetic illusion, and hallucination of motion. The term kinaesthetic hallucination is indebted to the Greek words *kinēsis* (movement) and *aisthēsis* (feeling). In a broad sense, it is used to denote a hallucinatory or illusory feeling of motion of the body or a body part. In a more restricted sense, it is used to denote the hallucinatory or illusory sensation of whole body movement, exemplified by the sensations of locomotion and flying. Hallucinated movements of the limbs or other body parts are best designated as \*motor illusions. These are typically accompanied by the illusory involvement of muscular activity. The term kinaesthesia was introduced in 1880 by the British neurologist Henry Charlton Bastian (1837–1915). Bastian proposed the term to replace the older term 'muscle sense' because, as he maintained, not all the afferent information involving body movement stems from the muscles. The German psychiatrist August Cramer (1860–1912) has been credited with publishing the first clinical study on \*proprioceptive as well as kinaesthetic hallucinations in 1889. Although kinaesthetic hallucinations and motor illusions are seldom a prominent feature of \*psychosis, they can manifest in a multitude of ways. The Swiss psychiatrist Eugen Bleuler (1857–1939) provided an apt illustration of this when he wrote, "Illusions and hallucinations of the kinaesthetic senses or the vestibular organs are usually in the background of the clinical picture. Yet the patients may firmly believe that they are carrying out certain actions, whereas in reality they are lying still

in bed or standing motionless against a wall. Obviously then these organs must be participating in the hallucinatory activity. In dream-like states we note the patients making uncoordinated movements, almost like epileptics while they themselves believe that they are fighting for their lives or participating in some love-scene. Under certain conditions, they believe that they are being carried from one place to another; that they are being tossed in the air or stood on their heads. It may also happen that patients believe that one of their limbs is in motion, whereas objectively nothing is to be noted." A special variant of the kinaesthetic hallucination is the \*space-motion hallucination. Another variant, which may occur in association with \*verbal auditory hallucinations, is the \*motor verbal hallucination (also known as \*subvocalization). The illusory sensation of flying is associated primarily with the use of \*hallucinogens such as mescaline, bufotenine, hyoscyamine, and possibly kava. Both kinaesthetic hallucinations and motor illusions can be classified as subclasses of the group of \*illusory movement experiences. As demonstrated in myriad experimental configurations, kinaesthetic hallucinations can be evoked within seconds when muscle vibration is used to generate proprioceptive misinformation about limb position. Some examples of the resulting \*phantom illusions are the \*illusory arm extension and the \*Pinocchio illusion. In parapsychology, kinaesthetic hallucinations are sometimes interpreted as signs of actual movement of the body or of an 'ethereal' component thereof. For example, the illusory feeling of rising upwards is considered a common feature of \*near-death experiences (NDEs).

### References

- Bleuler, E. (1950). *Dementia praecox or the group of schizophrenias. Monograph series on schizophrenia no. 1*. Translated by Zinkin, J. Madison, WI: International Universities Press.
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### **Kinaesthetic Illusion**

see Kinaesthetic hallucination.

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### **Kinesthetic Hallucination**

see Kinaesthetic hallucination.

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### **Kinetic Depth Effect**

see Windmill illusion.

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### **Kinetopsia**

The term kinetopsia comes from the Greek words *kinēsis* (movement) and *opsis* (seeing). It is used to denote a visually perceived illusory movement. The term is used in opposition to \*akinetopsia. Both phenomena are classified as \*metamorphosias.

#### **Reference**

Ey, H. (1973). *Traité des hallucinations. Tome 1*. Paris: Masson et Cie., Éditeurs.

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### **Koren Helmet**

Also referred to as God helmet. The eponym Koren helmet refers to the Canadian technician and patent inventor Stanley Koren. It is used to denote a laboratory apparatus (which initially had the shape of a helmet), developed by Koren in close collaboration with the American-Canadian neuropsychologist Michael A. Persinger (b. 1945). The device is able to apply complex, computer-generated magnetic

signals to the head of a test person. The Koren helmet generates a very weak rotating magnetic field of the order of 10 nT to 1  $\mu$ T. It has been used as a research tool to study the role of the temporo-parietal lobes in the mediation of religious and \*mystic experiences. It has been claimed by Persinger et al. that in this way they have succeeded in evoking \*sensory deceptions such as \*sensed presence, \*ecstatic auras, and \*visual hallucinations, a substantial number of which had a bearing on the image or presence of God or Jesus Christ. For example, one test person reported seeing a clear \*apparition, consisting of the shoulders and head of Christ. Other test persons reported sensing the presence of dead relatives, spirits, the Great Forces, etc. Reportedly the Koren helmet has also aided in mediating \*visions of demoniac beings, \*out-of-body experiences, visions of 'other realities', and a range of other sensory deceptions. It has been suggested that the results obtained by Persinger's group indicate that religious experiences in general may have a neural basis.

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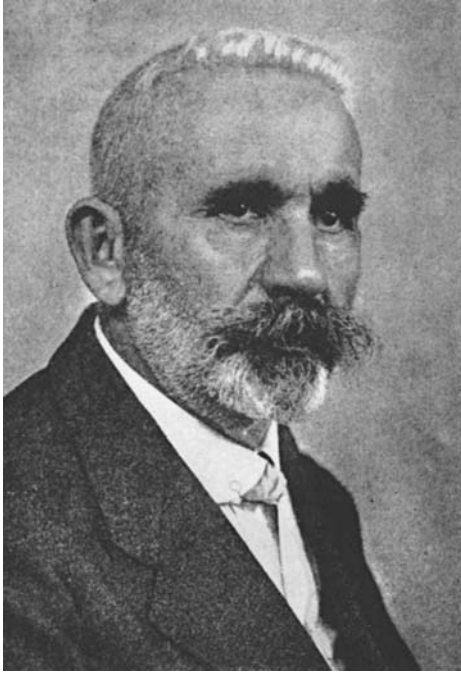
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### **Kraepelin's Definition of Hallucinations and Illusions**

In 1913 the German psychiatrist Emil Wilhelm Magnus Georg Kraepelin (1856–1926) defined hallucinations and \*illusions as follows: "On behalf of clinical consideration, Esquirol, and after him for practical purposes the majority of researchers, have discriminated between two kinds of sensory misperceptions, namely those in which there is no external stimulus source whatsoever: *hallucinations*, and those that can only be considered a forgery of a genuine perception by means of one's own additions: *illusions*."



**Fig. 2** Emil Kraepelin. Source: Psychiatrie-Historischen Sammlung der Psychiatrischen Klinik der Ludwig-Maximilians-Universität München

#### Reference

Kraepelin, E. (1913). *Psychiatrie. Ein Lehrbuch für Studierende und Ärzte. I. Band. Allgemeine Psychiatrie. Achte, vollständig umgearbeitete Auflage.* Leipzig: Verlag von Johann Ambrosius Barth.

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#### Krafft-Ebing's Definition of Hallucinations

In 1897 the German psychiatrist Richard Freiherr von Krafft-Ebing (1840–1902) defined hallucinations as follows: “The individual affected by hallucinations sees, hears, smells, tastes, feels with the full clarity of an objectively founded sense perception things which lack an actual founding.”

#### Reference

Von Krafft-Ebing, R. (1897). *Lehrbuch der Psychiatrie auf klinischer Grundlage für praktische Ärzte und Studierende. Sechste vermehrte und verbesserte Auflage.* Stuttgart: Verlag von Ferdinand Enke.

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#### Kundt's Rule

see Opperl–Kundt illusion.

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## La Barre's Definition of Hallucinations

In 1975 the American anthropologist Raoul Weston La Barre defined hallucinations as follows: "In careful present-day usage, hallucination indicates a false appearance, in sensory form, hence seemingly external, but occasioned by an internal condition of the mind, the central suggestion of the term being its subjectivity and groundlessness."

### Reference

La Barre, W. (1975). *Anthropological perspectives on hallucination and hallucinogens*. In: *Hallucinations. Behavior, experience, and theory*. Edited by Siegel, R.K., West, L.J. New York, NY: John Wiley & Sons.

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## La Barre's Definition of Illusions

In 1975 the American anthropologist Raoul Weston La Barre defined \*illusions as follows: "'Illusion' is a false mental appearance made by some actual external cause acting on the senses but capable of conceptual correction. Thus mistaking a tree in the dark for a man is an illusion, of which the tree may be disabused by various forms of reality testing; emphasis is on the ready correctibility of an illusion."

### Reference

La Barre, W. (1975). *Anthropological perspectives on hallucination and hallucinogens*. In: *Hallucinations. Behavior, experience, and theory*. Edited by Siegel, R.K., West, L.J. New York, NY: John Wiley & Sons.

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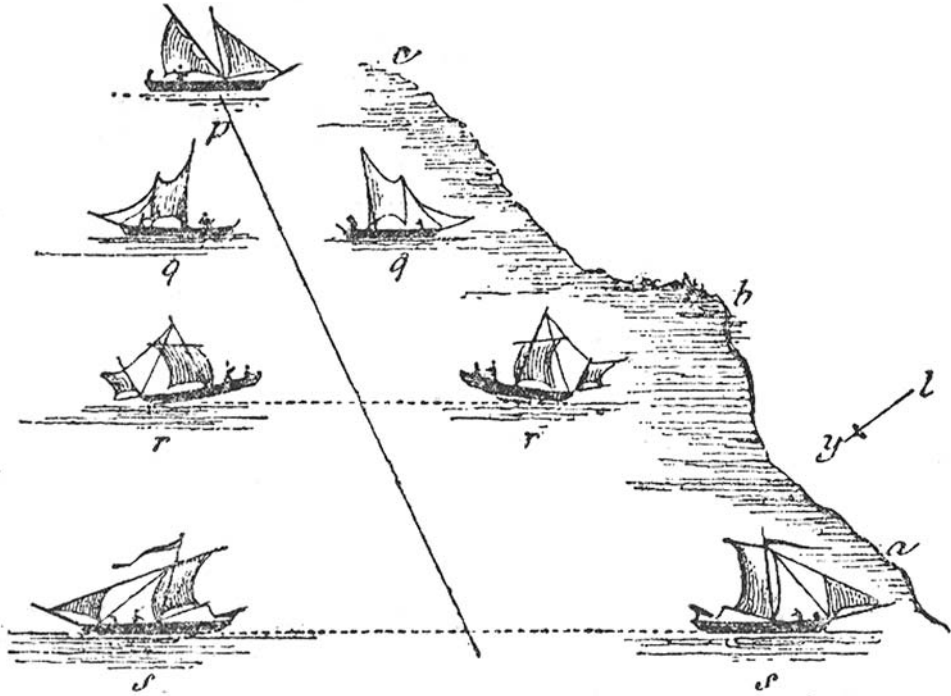
## Lady in the Moon

see Man in the Moon.

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## Lateral Mirage

The term lateral mirage comes from the Latin adjective *lateralis* (side) and the French verb *se mirer* (to reflect, to be reflected). It is used to denote a type of \*mirage or \*physical illusion occurring along hot, vertical structures such as a sunlit wall, reflecting the scene or landscape just beyond that structure. Lateral mirages can be designated as \*inferior mirages occurring in the vertical plane. They are attributed to differences in the refractive index of the air, due to a lateral temperature gradient caused by the heat of the wall, and the cooler air a few centimetres away. Temperature gradients of a relatively high complexity can yield complex distortions. These include vibrating, horizontally extended (i.e. 'towering'), and flattened (i.e. 'stooping') images. The term lateral



**Fig. 1** Lateral mirage. Source: Flammarion, C. (1873). *The atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

mirage is used in opposition to the terms \*inferior mirage, \*superior mirage, and \*double mirage.

#### Reference

Lynch, D.K., Livingston, W. (1995). *Color and light in nature*. Cambridge: Cambridge University Press.

#### Lattice

see Chessboard design.

#### Laudanum and Hallucinations

see Opioid-induced hallucination.

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#### Laughing Gas and Hallucinations

see Nitrous oxide hallucination.

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#### Lavater's Definition of Hallucinations

In 1572 the Swiss theologist Ludwig Lavater, also known as Ludovic Lavater (1527–1586), whose translated work heralded the introduction of the term hallucination to the English language, defined hallucinations as “Ghoses and spirites walking by nyght, and strange noyses, crackes, and sundry forwarnynges, whiche commonly happen before the death of menne, great slaughters and alterations of Kyngdomes.”

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**Leber's Congenital Amaurosis (LCA) and Hallucinations**

The eponym Leber's congenital amaurosis refers to the German ophthalmologist Theodor Karl Gustav von Leber (1840–1917), who was the first to describe the concomitant condition in 1869. LCA is considered a type of \*amaurosis, due to an autosomal recessive disorder caused by one of a variety of genes involved in the development of the retina's photoreceptors. LCA typically begins with decreased visual acuity at the age of 1 year. The disease may manifest itself not only in the form of an annular scotoma with tunnel vision, due to damage to the retina's outer edge, but also in the form of a central scotoma which leaves peripheral vision intact. Other important symptoms include \*night blindness and difficulty coping with glare. When LCA progresses to the level of \*blindness, the condition may be complicated by \*visual hallucinations (also referred to as \*ophthalmopathic hallucinations, as in \*Charles Bonnet syndrome) or \*synaesthesias. Clinically, LCA is associated with a variety of systemic and neurological disorders, including mental retardation, hydrocephalus, polycystic kidney disease, osteopetrosis, and skeletal abnormalities such as congenital hip dysplasia and a small mandible.

**References**

- Armel, K.C., Ramachandran, V.S. (1999). Acquired synesthesia in retinitis pigmentosa. *Neurocase*, 5, 293–296.
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- Schroeder, R., Mets, M.B., Maumenee, I.H. (1987). Leber's congenital amaurosis. Retrospective review of 43 cases and a new fundus finding in two cases. *Archives of Ophthalmology*, 105, 356–359.

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**Lecanomancy**

see Crystal-Vision.

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**Lee, Ann (1736–1784)**

Also known as Ann the Word, Mother Ann, and Mother Ann Lee. One of the founders of the Shakers, who claimed divine guidance in the form of \*visions and other messages from God. Lee taught the attainment of perfect holiness by giving up all sexual relations. The spells of shaking and trembling from which she suffered (and from which the Shaker movement derived its name) were attributed by her to sin being purged from the body by the Holy Spirit. Her visions and fits, in which she allegedly “became one with the Saviour in body and spirit”, have been attributed retrospectively to epilepsy.

**References**

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- Devinsky, O., Lai, G. (2008). Spirituality and religion in epilepsy. *Epilepsy and Behavior*, 12, 636–643.
- Maudsley, H. (1887). *Natural causes and supernatural seemings. Second edition*. London: Kegan, Paul, Trench & Co.

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**Left Size Distortion**

see Hyperschematia.

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**Leibhafte Bewusstheit**

A German term that translates as ‘vivid physical awareness’ or ‘concrete awareness’. The term *leibhafte Bewusstheit* was used by the German psychiatrist and philosopher Karl Jaspers (1883–1969) to denote what is generally known as \*sensed presence. Both terms are synonyms for somaesthetic doppelgänger, somaesthetic phantom double, false proximate awareness, and *Anwesenheit*.

## References

- Brugger, P., Regard, M., Landis, Th. (1997). Illusory reduplication of one's own body: Phenomenology and classification of auto-scopic phenomena. *Cognitive Neuropsychiatry*, 2, 19–38.
- Jaspers, K. (1997). *General psychopathology. Volume 1*. Translated by Hoenig, J., Hamilton, M.W. Baltimore, MA: Johns Hopkins University Press.

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## Lelong's Definition of Hallucinations

In 1928 the French psychiatrist Pierre Lelong defined hallucinations as follows: "A hallucination is a mental automatism unrecognized as [something] personal."

### Reference

- Lelong, P. (1928). *Le problème des hallucinations*. Paris: Librairie J.-B. Baillière et Fils.

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## Leubuscher's Definition of Hallucinations

In 1852 the German psychiatrist Rudolf Leubuscher (1822–1861) defined hallucinations as follows: "Hallucinations are those sense perceptions that come into being without the cooperation of external objects."

### Reference

- Leubuscher, R. (1852). *Über die Entstehung der Sinnestäuschung. Ein Beitrag zur Anthropologie*. Berlin: Ferd. Dümmler's Verlagsbuchhandlung.

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## Lhermitte Syndrome

see Peduncular hallucination.

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## Lhermitte's Definition of Hallucinations

In 1951 the French psychiatrist Jean Lhermitte (1877–1959) defined hallucinations as follows: "One could say that the hallucination is 'a perception without an object'."



Fig. 2 Jean Lhermitte

### Reference

- Lhermitte, J. (1951). *Les hallucinations. Clinique et physiopathologie*. Paris: G. Doin.

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## Lhermitte's Definition of Illusions

In 1951 the French psychiatrist Jean Lhermitte (1877–1959) defined \*illusions as follows: "The *illusion*. This one is no longer a perception without material backup, without object, it is a deformed perception."

### Reference

- Lhermitte, J. (1951). *Les hallucinations. Clinique et physiopathologie*. Paris: G. Doin.

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## Lhermitte's Hallucinosis

see Peduncular hallucination.

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### Light Flashes

see Photopsia.

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### Light Phonism

The term light phonism is indebted to the Greek noun *phônème*, which means voice or sound. It is used to denote a type of \*synaesthesia characterized by a hallucinated sound (i.e. a \*phonism) triggered by a regular visual percept.

#### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition.* Cambridge, MA: MIT Press.

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### Light Chaos

see *Eigengrau*.

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### Light Dust

see *Eigengrau*.

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### Lilliput Sight

see Micropsia.

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### Lilliput Vision

see Micropsia.

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### Lilliputian Hallucination

A term used to denote a hallucination featuring miniature individuals, animals, objects, or fantasy figures. The notion of lilliputian hallucination constitutes the logical and conceptual counterpart of the \*gulliverian hallucination. Both terms are borrowed from the novel *Gulliver's Travels* by

the Irish poet and author Jonathan Swift (1667–1745). It is known that Swift suffered from symptoms reminiscent of Ménière's disease and that he experienced cognitive changes, memory impairment, personality alterations, language disorder, and facial paralysis during the last 3 years of his life. It has been speculated that the miniature and giant figures he describes in *Gulliver's Travels* were inspired by \*visual hallucinations that he experienced himself. The term *hallucination lilliputiennne* was introduced into the medical jargon in 1909 by the French psychiatrist Raoul Leroy. However, the phenomenon itself was described much earlier. In the oldest known text that seems to refer to lilliputian hallucinations, St. Macarius the Elder of Alexandria (AD 300–390) speaks of “little strangers”. Ancient Siberian peoples referred to ‘fly-agaric men’ and ‘amanita girls’ in connection with the lilliputian hallucinations said to occur in the context of Amanita intoxication. According to the French psychiatrist Henri Ey (1900–1977), lilliputian hallucinations differ from gulliverian ones not only in their perceived size but also in the affective tone which they evoke. Ey depicts the little beings as gay, joyous creatures that jump and dance, climb onto tables, leave through doors or windows, and march around like troops of little soldiers. In contrast to the allegedly sombre colours of gulliverian hallucinations, they tend to display brilliantly coloured outfits. A special feature of lilliputian hallucinations is that they sometimes metamorphize into different creatures. Like the French psychiatrist Jean-Jacques Lhermitte (1877–1959), Ey is convinced that lilliputian hallucinations not only occur within the context of mental disease but are also experienced by otherwise healthy persons. They have been described in individuals with such varied conditions as alcohol withdrawal, acute nicotine intoxication, \*delirium, dementia, migraine, \*Charles Bonnet syndrome, toxoplasmosis infection, basilar migraine, and mesencephalic lesions. In individuals with a clinical diagnosis of \*schizophrenia they would appear to be relatively rare. Except for their occurrence in the context of \*peduncular hallucinosis, the pathophysiology of lilliputian hallucinations is largely unknown. Lilliputian hallucinations should not be confused with \*microscopic hallucinations or \*microptic hallucinations. According to Leroy, in the case of lilliputian hallucinations “the subject has an absolutely normal conception of the size of the surrounding objects, [while] the perception of littleness has a

bearing on nothing but the hallucination.” Neither should they be confused with lilliputianism, Lilliput sight, and Lilliput vision, which are all synonyms for \*micropsia. Depending on the number of sensory modalities in which they appear, lilliputian hallucinations can be classified either as \*visual or \*compound hallucinations.

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- Leroy, R. (1909). Les hallucinations lilliputiennes. *Annales Médico-psychologiques*, 10, 278–294.
- Lewis, D.J. (1961). Lilliputian hallucinations in the functional psychoses. *Canadian Psychiatric Association Journal*, 6, 177–201.
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## Lilliputianism

see Micropsia.

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## Lincoln's Top Hat Illusion

see Top hat illusion.

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## Liszt, Ferenc (1811–1886)

Better known as Franz Liszt. A Hungarian composer, teacher, and pianist who possibly experienced \*synaesthasias of the \*coloured music type. This assumption is based on an anonymous report stating that Liszt regularly gave directions to the members of his orchestra, saying,

“O please, gentlemen, a little bluer, if you please! This tone type requires it!”, or, “That is a deep violet, please, depend on it! Not so rose!”

### Reference

- Mahling, F. (1926). Das Problem der 'Audition colorée': Eine historisch-kritische Untersuchung. *Archiv für die gesamte Psychologie*, 57, 165–301.

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## Locura

*Locura* is Spanish for madness. The term is used in Colombia and other Latin American countries to denote a severe form of \*psychosis or \*dissociation characterized by attacks of headache, agitation, bizarre, and sometimes violent behaviour, convulsions, loss of consciousness, and \*auditory, \*visual, \*olfactory, and \*compound hallucinations. The attacks are called *ataques de locura* (i.e. madness attacks). The hallucinations occurring during these attacks would often seem to feature wild animals (such as monkeys, jaguars, and snakes), and/or demonic beings. In folk medicine, *ataques de locura* tend to be attributed to magic or to be regarded as a sign that one is worthy to become a shaman. Although the attacks defy diagnosis in terms of Western classifications, they have been variously labelled as mass hysteria, somatoform disorder of the conversive type, and 'culture-bound syndrome'.

### Reference

- Piñeros, M., Rosselli, D., Calderon, C. (1998). An epidemic of collective conversion and dissociation disorder in an indigenous group of Colombia: Its relation to cultural change. *Social Science and Medicine*, 46, 1425–1428.

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## Logopsia

see Visual verbal hallucination.

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## Loss of Stereoscopic Vision

The term loss of stereoscopic vision is used to denote a type of \*metamorphopsia characterized by a two-dimensional or 'flat' appearance of a



stereoscopically perceived environment. The term is used in opposition to \*enhanced stereoscopic vision.

#### Reference

Critchley, M. (1949). Metamorphopsia of central origin. *Transactions of the Ophthalmologic Society of the UK*, 69, 111–121.

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### Loudness Discomfort

see Hyperacusis.

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### Loudness Intolerance

see Hyperacusis.

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### Love-Phantom

see Mare.

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### LSD and Hallucinations

see Lysergic acid diethylamide (LSD) and hallucinations.

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### LSD Trip

Originally a street term, LSD trip is now generally accepted to denote a \*phantasmagoria of hallucinations, \*illusions, and \*sensory distortions, following each other in a kaleidoscopic fashion and occurring within the context of intoxication with \*lysergic acid diethylamide (LSD). A person seeking LSD trips for the purpose of exploring the psyche may be called a \*psychonaut.

#### Reference

Cohen, S. (1964). *Drugs of hallucination*. London: Secker & Warburg.

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### Lucid Dream

Also known as ‘dreaming true’. The term lucid dream is indebted to the Latin adjective *lucidus*, which means shining, luminescent, clear. It was introduced in or shortly before 1913 by the Dutch psychiatrist and author Frederik van Eeden (1860–1932) to denote a \*dream during which the dreamer realizes that he or she is dreaming. As van Eeden maintains, “In these lucid dreams the reintegration of the psychic functions is so complete that the sleeper remembers day-life and his own condition, reaches a state of perfect awareness, and is able to direct his attention, and to attempt different acts of free volition.” Using the state of consciousness at the start of the lucid dream as a guiding principle, the group of lucid dreams has been divided into dream-initiated lucid dreams or DILDs (i.e. a regular dream during which the dreamer eventually discovers that he or she is dreaming) and wake-initiated lucid dreams or WILDs (which progress from a normal waking state directly into a dream state). As a phenomenon, lucid dreaming was described long before van Eeden’s day. As the British surgeon Walter Cooper Dendy (1794–1871) wrote in 1847, “It has been asserted, especially by two profound metaphysicians, Beattie and Reid, that they *persuaded* themselves in their dreams that they *were* dreaming, and would then attempt to throw themselves off a precipice; this awoke them, and proved the impression a fiction.” The Greek philosopher Aristotle (384–322 BC) has been credited with providing one of the earliest written references to lucid dreams: “If the sleeper perceives that he is asleep, and is conscious of the sleeping state during which the perception comes before his mind, it presents itself still, but something within him speaks to this effect: ‘the image of Coriscus presents itself, but the real Coriscus is not present’; for often, when one is asleep, there is something in the soul which declares that what then presents itself is but a dream.” In 1968 the British author Celia Elizabeth Green (b. 1935) distinguished four different psychological causes or mechanisms that can initiate the awareness that one is dreaming. She designates these as emotional stress within the dream (as in a \*nightmare, for example), the recognition of an incongruity within the dream, the initiation of analytical thought, and the recognition of the “dreamlike quality” of the experience. The term

lucid dream is also used to denote a hypnotically induced \*scenic hallucination. The mental state characteristic of both types of lucid dreaming is called \*double consciousness. Van Eeden uses the term lucid dreaming in opposition to six other terms: initial dreaming, pathological dreaming, ordinary dreaming, vivid dreaming, symbolic or mocking dreaming, and general dream sensation. Seen from a different vantage point, the term lucid dream is also used in opposition to the terms \*false awakening (i.e. the subjective feeling of awakening while one continues to dream) and \*pre-lucid dream. A person intentionally employing lucid dreaming for the purpose of exploring the psyche may be called a \*psychonaut.

### References

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## Lucidity

see Clairvoyance.

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## Lues and Hallucinations

see Syphilitic hallucinosis.

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## Luminous Hemianopia

see Hemianopia.

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## Luminous Phenomenon

The term luminous phenomenon is indebted to the Latin adjective *luminosus*, which means well-

lit, shining, luminescent. In parapsychology and occultism it is used as a generic term for various types of self-generated light that cannot be explained by recourse to natural principles. Some examples of luminous phenomena are the ‘clear white fire’ or ‘psychic light’ which reportedly emanates from certain mediums, so-called spectral lights, and phosphorescent wounds. The notion of luminous phenomenon should not be confused with \*body photism, which is a hallucinated patch of light perceived as emanating from one’s own body during \*out-of-body experiences.

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## Lunar Bow

see Rainbow.

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## Luther, Martin (1483–1546)

A German monk, theologian, and university professor, probably best known for his role as church reformer, and as the founder of Protestantism. Luther suffered from many diseases and ailments, including fainting fits, vertigo, and \*tinnitus. Reportedly, his tinnitus was complicated on at least one occasion by \*musical hallucinations (consisting of the sound of church bells). Legend has it that Luther also awoke to see the devil in a corner of his room in Wartburg and that he sought to defend himself by throwing an inkwell in its direction. Although it is well documented that as a child Luther felt haunted by the devil, as well as by demons and spirits, and again as an adult, it is unclear whether he had any \*visual or \*compound hallucinations. The French alienist Alexandre Jacques François Brierre de Boismont (1797–1881) maintains that “from a scientific point of view, Luther is proved to have had hallucinations”. He supports his case with a quotation from Luther himself, in which he appears to reveal his conviction that the devil was actually present in his bedroom, saying that “this explains to me how it sometimes happens that men are found dead in their beds – it is Satan who has strangled them.” Others have refuted Brierre

de Boismont's stance on this matter by arguing that Luther's reference to the devil in the bedroom may well have been allegorical. Another reason for scepticism is the fact that the scene apparently took place when Luther was awakened from his sleep. If it is true that Luther experienced a \*sensory deception depicting the devil, this may well have been a \*hypnopompic hallucination or a \*false awakening rather than a \*hallucination proper.

### References

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### Lycanthropy

see Clinical lycanthropy.

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### Lycomania

see Clinical lycanthropy.

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## Lysergic Acid Diethylamide (LSD) and Hallucinations

Lysergic acid diethylamide is known under many names, including LSD, LSD-25, and acid. It is usually classified as a semi-synthetic \*psychedelic substance of the family of ergot alkaloids, as a \*hallucinogen or an \*entheogen. The ergotamine molecule LSD-25 was synthesized in 1938 out of the parasitic fungus ergot (*Claviceps purpurea*) by the Swiss chemist and philosopher Albert Hofmann (1906–2008). In 1943 Hofmann drank a crystalline preparation of LSD-25 in a glass of water and discovered its powerful hallucinogenic effects, including an instance of \*out-of-body experience (OBE). LSD-25, or LSD for short, proved to be several thousand times as potent as mescaline, making it the hallucinogen of choice for the biomedical and military drug

studies carried out during the 1950s and 1960s. Like mescaline, LSD was used to create so-called model psychoses in the hope that these would shed light on the pathophysiology of the major psychotic disorders. Retrospectively, those studies established as many differences as similarities between idiopathic and drug-induced \*psychoses. But to their credit, it should be noted that the ensuing biochemical hypotheses of hallucinatory activity roused the interest of researchers studying the neurotransmitter 5-hydroxytryptamine (5-HT) or serotonin. LSD was also used as an experimental therapeutic within the context of LSD psychotherapy for individuals suffering from alcoholism or major psychiatric disorders such as \*post-traumatic stress disorder (PTSD) and psychotic disorders. In addition, it was popularized by representatives of the counterculture such as the British-American writer Aldous Leonard Huxley (1894–1963) and the American psychologist and writer Timothy Francis Leary (1920–1996), and soon became a widely used recreational drug. LSD can be administered orally, through the lungs, intravenously, and subcutaneously. Its principal mechanism of action is believed to be its partial agonistic effect on the 5-HT<sub>2A</sub> serotonin receptor in the CNS, as well as on a large number of the G-protein coupled receptors, including all the dopamine receptor subtypes, and all the adrenoceptor subtypes. Even when administered in a dosage of 0.5 µg/kg bodyweight, LSD is capable of mediating a \*phantasmagoria of perceptual experiences, commonly referred to as a trip or \*LSD trip. These perceptual experiences tend to commence with relatively simple phenomena such as \*sparkling (i.e. \*hyperchromatopsia), \*entoptic phenomena, \*phosphenes, \*aeropsia, \*visual illusions, \*geometric visual hallucinations, \*aftereffects, afterimage-like \*trailing phenomena, \*palinopsia, \*hyperacusis, \*diplacisus, \**Gedankenlautwerden*, \*auditory illusions, \*synaesthesias, a variety of perceptual disturbances designated as the \*Alice in Wonderland syndrome (which includes \*metamorphopsias such as \*micropsia, \*macropsia, \*macroproxiopia, \*microtelepsia, \*teleopsia, and \*plagiopsia, as well as subjective feelings such as derealization, depersonalization, and somatopsychic duality), \*body schema illusions, out-of-body experiences, illusory feelings of levitation, and illusory alterations in the passage of time (i.e. \*time distortions). The perception of such simple phenomena is enhanced by the

closing of the eyes, darkness, and quiet, and altered or interrupted by intrusive sense perceptions such as those stemming from a conversation or physical exercise. \*Complex, \*compound, and \*scenic hallucinations are relatively rare at a dosage of 0.5  $\mu\text{g}/\text{kg}$ . Instead, LSD users often report that the extracorporeal world appears strangely animated: for instance, static objects may be perceived as moving relative to one or more spatial dimensions. In addition, LSD tends to mediate feelings of euphoria and hyperarousal. At a dosage of 1.0  $\mu\text{g}$  LSD/kg, visual percepts tend to become more intense, developing into kaleidoscopic, scenic hallucinations depicting a distorted fantasy world inhabited by cartoon figures or other bizarre creatures. The physical reactions to LSD are highly variable. They include fever, hypothermia, hyperglucosaemia, tachycardia, perspiration, mydriasis, hypersalivation, insomnia, \*paraesthesias, numbness, muscular weakness or rigidity, hyperreflexia, trembling, and nausea. The long-term effects include a general decrease in higher cortical functioning (which may lead to concentration problems and formal thought disorders), subtle EEG changes, psychotic phenomena, abnormalities in colour perception, \*flashbacks, and \*hallucinogen-induced persistent perception disorder (HPPD), a condition characterized by the recurrence or persistence of entoptic phenomena and/or visual hallucinations, reminiscent of those experienced during a prior episode of intoxica-

tion with hallucinogens. LSD use may also entail a so-called bad trip. Occasionally, such 'bad trips' develop into prolonged and/or recurrent psychotic states indistinguishable from those experienced by individuals with a clinical diagnosis of \*schizophrenia. On the basis of various studies, the lifetime prevalence of LSD-induced prolonged psychosis is estimated at around 4 in 1,000 individuals. A person intentionally using LSD for the purpose of exploring the psyche may be called a \*psychonaut.

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# M

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## Mach Band Illusion

see Mach bands.

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## Mach Bands

Also known as Mach's bands and Mach band illusion. All three eponyms refer to the Czech-born Austrian physicist and philosopher Ernst Mach (1838–1916), who first described the concomitant phenomenon in 1865. They refer to a contrast illusion that can be perceived in two or more adjacent fields with different hues, interconnected by a colour gradient. This contrast illusion consists of darker and brighter bands bordering the edges of the colour gradient, lending the edge of the light field an even lighter appearance and the edge of the dark field an even darker appearance. Although the mediation of Mach bands is not fully understood, an important role is attributed to reciprocal lateral inhibition by adjacent cones in the retina. As a consequence, Mach bands are commonly classified as \*entoptic phenomena. Because their occurrence is bound up with the inherent properties of the perceptual system, they can also be classified as \*physiological illusions. Mach bands should not be confused with a related contrast illusion called the \*Cornsweet effect.

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tions. *Proceedings of the National Academy of Sciences of the United States of America*, 96, 5245–5250.

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## Macpherson's Definition of Hallucinations

In 1899 the Australian psychiatrist John Macpherson (b. 1861) defined hallucinations as follows: "Hallucination may... be defined as a morbid phenomenon, the result of dissociated cerebral action, by means of which a perception that has no objective basis or reality is subjectively perceived by the conscious mind, and projected externally."

### Reference

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## Macroproxiopia

The term macroproxiopia comes from the Greek adjective *makros* (large), the Latin adjective *proximus* (near, nearby), and the Greek noun *opsis* (seeing). It refers to a visual distortion in which

J.D. Blom, *A Dictionary of Hallucinations*,

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**Fig. 1** Ernst Mach

the perceived size and distance of objects is altered. Macroproxiopia is classified either as a type of \*dysmetropsia or as a \*metamorphopsia. It may present as an isolated symptom, as part of an \*aura or as part of a cluster of symptoms called the \*Alice in Wonderland syndrome. Etiologically, it is associated primarily with epileptic seizures, migraine, and intoxication with \*hallucinogens such as LSD and mescaline.

#### Reference

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## Macropsia

Also known as macropsy, macroptic vision, megalopsia, and megalopia. The term macropsia comes from the Greek words *makros* (large) and *opsis* (seeing). It refers to a visual distortion in which objects and stimuli are perceived as disproportionately large. The process of increasing the apparent size of objects and stimuli is called \*magnification. When macropsia sets in

gradually rather than abruptly, it is called \*zoom vision. When objects are repeatedly magnified and minified in the course of seconds, the term \*pulsation phenomenon applies. Macropsia is classified either as a type of \*dysmetropsia or as a \*metamorphopsia. It can occur physiologically in the form of \*oculomotor macropsia, but it can also occur in the context of neurological disease. In the context of disease, macropsia may present as an isolated symptom, as part of an \*aura, or as part of a cluster of symptoms called the \*Alice in Wonderland syndrome. Etiologically, macropsia is associated primarily with paroxysmal neurological disorders such as epilepsy and migraine. It can also be evoked by intoxication with alcohol or with \*hallucinogens such as LSD and mescaline. In \*hemimacropsia, the perceived enlargement of objects restricts themselves to one of the visual hemifields. The term \*central macropsia is used to denote a type of macropsia that restricts itself to the central field of vision, leaving objects and stimuli perceived in the periphery of the visual field in their normal proportions. The term macropsia is used in opposition to \*micropsia. It should not be confused with the term \*macroptic hallucination. Conceptually, macropsia can be considered the visual equivalent of \*macrostereognosia (i.e. feeling things as larger than they are). The two conditions have also been known to occur in conjunction.

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## Macropsy

see Macropsia.

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## Macroptic Hallucination

The term macroptic hallucination is indebted to the Greek words *makros* (large) and *opsis* (seeing). It refers to a \*visual hallucination in which

the object or scene in question is perceived as disproportionately large in comparison with the objects seen in regular sense perception. A variant of the macroptic hallucination depicting disproportionately large human figures is known as a \*gulliverian hallucination. Macroptic hallucinations may present as an isolated symptom, as part of an \*aura or as part of a cluster of symptoms called the \*Alice in Wonderland syndrome. Etiologically, they are associated with such varied conditions as \*delirium, \*delirium tremens, alcohol withdrawal, toxoplasmosis and typhoid infections, basilar migraine, mesencephalic lesions, \*Charles Bonnet syndrome, and intoxication with \*hallucinogens such as LSD and mescaline. The term macroptic hallucination is used in opposition to \*microptic hallucination. It should not be confused with \*macropsia.

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## Macroptic Vision

see Macropsia.

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## Macroscopic Aura

The term macroscopic aura comes from the Greek words *makros* (large), *skopeō* (I am looking at), and *aura* (breeze, smell). It refers to a type of \*aura (i.e. a 'warning symptom') occurring in the context of paroxysmal neurological disorders such as epilepsy and migraine, in which objects and stimuli in the extracorporeal environment are perceived as disproportionately large. The introduction of the French term *aura macroscopique* has been attributed to the Swiss neurologist Otto Veraguth (1870–1944). The term is used in opposition to the term \*microscopic aura.

### Reference

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## Macrosomatognosia

The term macrosomatognosia comes from the Greek words *makros* (large), *sōma* (body), and *gnōsis* (insight). It translates roughly to 'experiencing the body as larger'. The term was introduced in or shortly before 1963 by the Dutch neurologist Joseph Antonius Maria Frederiks to denote a disorder of the body scheme in which either a part of the body, or the body as a whole, is experienced as disproportionately large. The phenomenon itself was described as early as 1905 by the French neurologist Pierre Bonnier (1861–1918), in the context of what he called \*aschematia. When the whole body is experienced as enlarged, the expressions \*whole body macrosomatognosia and total body macrosomatognosia are used. When one or more parts of the body are experienced as enlarged, the term \*partial macrosomatognosia is used. Frederiks lists three general characteristics of macrosomatognosia, i.e. (1) its paroxysmal character, (2) its occurrence in both halves of the body, and (3) its occurrence in the unclouded mind. Macrosomatognosia may present as an isolated symptom, as part of an \*aura, as part of a cluster of symptoms called the \*Alice in Wonderland syndrome, or as part of the cluster of symptoms designated as \*schizophrenia. Etiologically, it is associated with a variety of conditions including epileptic seizures, migraine, \*delirium, \*delirium tremens, alcohol withdrawal, toxoplasmosis or typhoid infections, mesencephalic lesions, and intoxication with \*hallucinogens such as LSD and mescaline. Macrosomatognosia may also occur as a transient phenomenon in \*hypnagogic states. It is generally classified as a \*body schema illusion or as a type of somatognosia. The term macrosomatognosia is used in opposition to the term \*microsomatognosia.

### References

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**Fig. 2** Alice in Wonderland – macrosomatognosia. Illustration by John Tenniel

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## Macrosterognosia

Also known as macrostereognosis. Both terms stem from the Greek adjective *makros* (large) and the medical term stereognosis (from the Greek words *stereos* (solid, tight, compact) and *gnōsis* (insight)), meaning the ability to identify solid objects through tactile sensation. The term macrostereognosis was introduced in or shortly before 1945 by the Jewish neurologist Lipman Halpern to denote a tactile \*illusion in which an object, held in the palm of one's hand, for example, appears to be significantly more bulky and massive than it actually is. The term macrostereognosis is used in opposition to \*microstereognosis. Pathophysiologically, both conditions are associated primarily with thalamic dysfunction and with mild parietal sensory impairment. Conceptually, macrostereognosis can be considered the tactile equivalent

of \*macropsia (i.e. seeing things as larger than they are). The two conditions have also been known to occur in conjunction.

## References

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## Macrosterognosis

see Macrosterognosis.



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### Macular Star Pattern

The term macular star pattern is indebted to the Latin noun *macula*, which means spot. It is used to denote a physiological \*entoptic phenomenon characterized by bright radial spokes. It would seem that some 20% of the individuals in the general population are able to produce the macular star pattern, usually by blinking.

#### Reference

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### Magazine Sign

A term used to denote a variant of the \*misidentification syndrome in which the affected individual imagines the events depicted in magazines as occurring in external, three-dimensional space. The magazine sign is a \*cognitive illusion described in elderly persons who usually also have \*visual hallucinations or \*illusions. Etiologically, it is associated primarily – although not necessarily – with Alzheimer’s disease and other types of dementia. Two related phenomena are the \*picture sign and the \*TV sign.

#### Reference

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### Magicum

see Hallucinogen.

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### Magnan’s Sign

Also known as Magnan–Saury’s sign and \*cocaine bugs. The eponym Magnan’s sign refers to the French alienist Jacques Joseph-Valentin Magnan (1835–1916), who described the concomitant phenomenon in 1889 in a paper co-authored by a pupil named Saury (hence the second eponym, Magnan–Saury’s sign). Both eponyms refer to a crawling, \*tactile halluci-

nation of a foreign body under the skin that is associated with the chronic use of cocaine. Save the association with cocaine, Magnan’s sign is comparable with \*formication.

#### Reference

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### Magnan–Saury’s Sign

see Magnan’s sign.

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### Magnetic Field Disturbances and Hallucinations

see Solar wind and hallucinations.

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### Magnification

The term magnification is indebted to the Latin adjective *magnus*, which means large. It is used to denote the process by which visually perceived objects or stimuli appear to increase in size. Magnification can occur in individuals wearing glasses with plus lenses and in the context of pathology (see the entry Macropsia). When magnification sets in gradually rather than abruptly, it can be accompanied by \*zoom vision. The term magnification is used in opposition to the term \*minification.

#### Reference

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### Maid of Orleans

see Joan of Arc.

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## Major Tranquilizers and Hallucinations

see Antipsychotics and hallucinations.

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## Malignant Hallucination

The term malignant hallucination is indebted to the Latin words *male* (bad) and *gignere* (to entail, to bring forth). It was coined in or shortly before 1960 by the American psychiatrist Gordon Forrer to denote a hallucination occurring in the context of pathology and constituting a burden to the affected individual. Forrer uses the term in opposition to \*benign hallucination. For a further discussion of Forrer's dichotomy of benign and malignant hallucinations, see the entry Benign hallucination.

### Reference

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## Mandragora of Theophrastus and Hallucinations

see *Atropa belladonna* and hallucinations.

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## Mandragora officinarum and Hallucinations

*Mandragora officinarum* is known under many names, including mandrake, dragon doll, love apple, fool's apples, Satan's apple, Satan's testicles, and witches' herb. In Arabic it is known as *Tufah al-jinn* (meaning apples of the \*djinn) and *Baydal-jinn* (testicles of the djinn). The etymological origin of the names mandragorum and mandrake is obscure. It has been speculated that they might stem from the Sanskrit words *mandros* (sleep) and *agora* (substance), but other explanations have been given as well. The Greeks used the name *mandragoras* to denote a plant related to *Atropa belladonna*, probably the one that was later to be named *Atropa mandragora*, or *M. officinarum*. Like henbane and belladonna, *M. officinarum* is classified as a species of the

Solanaceae or nightshade family. Using the criterion of psychoactive potential as a guiding principle, mandrake has been classified as a \*deliriant. *M. officinarum* is a stemless perennial plant indigenous to Europe, North Africa, and Western Asia which contains powerful tropane alkaloids such as hyoscyamine, hyoscyne (i.e. scopolamine), atropine, and mandragorine (i.e. cuscohygrine). The plant's root, leaves, and berries have been used since ancient times as an \*entheogen, an aphrodisiac, a therapeutic, an anaesthetic, an analgesic, a poison, and a potion, as well as for many other purposes. Due to its psychoactive properties, its nocturnal glowing, and the humanoid shape of its root, mandrake has historically been charged with magical connotations. Despite its reputation and rich history as one of the best-known psychoactive plants, very few descriptions of mandrake's hallucinogenic properties exist. They are reportedly similar to those of *A. belladonna*, i.e. mainly visual in nature. In addition, vivid \*dreaming has been reported, often with an erotic connotation. Mandrake's lack of popularity as a recreational drug is due largely to its adverse anticholinergic effects. These tend to commence before the onset of the hallucinatory activity and to continue during the entire hallucinatory episode. Because mandrake tends to slow the motility of the stomach and gut, the side effects may go on for a long time after the moment of ingestion. The name mandrake has also been used as a slang term for the sedative methaqualone, and as a synonym for the name mayapple (i.e. *Podophyllum peltatum*). A person intentionally employing mandrake for the purpose of exploring the psyche may be called a \*psychonaut.

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## Mandrake and Hallucinations

see *Mandragora officinarum* and hallucinations; see also the entry Mayapple and hallucinations.

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## Manic-Depressive Disorder and Hallucinations

see Mood disorder and hallucinations.

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## Man in the Moon

Also known as hare in the Moon and lady in the Moon. All three terms are used to denote a \*cognitive illusion consisting of a figure which can be discerned in the configuration of darker and lighter areas of the full Moon. Reportedly, familiarity with this illusion may be helpful in deciding whether a picture of the full Moon was taken while the photographer was looking eastward or westward.

### Reference

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## Mar

The term mar comes from the Old English noun \*mare, which means hag or goblin. In Germanic superstition it was used to refer to the male love-phantom, conceptualized as a special type of \*nightmare. It was regarded as a manifestation of a demonic living being capable of seducing and tormenting the sleeper while he or she is dreaming. As noted by the German classical scholar Wilhelm Heinrich Roscher (1845–1923), a certain analogy would seem to exist between the mar and the \*incubus. The term mar is used in opposition to the term \*mare, which refers to a love-phantom of the female sex.

### Reference

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## Mare

An Old English term meaning hag or goblin. In Germanic superstition it used to refer to the female love-phantom, which was conceptualized as a special type of \*nightmare. It was regarded as a manifestation of a demonic living being, capable of seducing and tormenting the sleeper in his or her dream. As noted by the German classical scholar Wilhelm Heinrich Roscher (1845–1923), a certain analogy would seem to exist between the mare and the \*succubus. The term mare is used in opposition to the term \*mar, which refers to a love-phantom of the male sex.

### Reference

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## Marihuana-Induced Hallucination

Marihuana is also written as marijuana. The origin of the name is unknown. It would seem to be of Mexican-Spanish origin, and it may have derived from the names Maria and Juana. An early corruption in the English language is the term Mary Warner. The term marihuana is often used as a synonym for cannabis. In fact, however, it refers to a cannabis product prepared from the dried flowering tops and leaves of the pistillate ('female') cannabis plant. Like other cannabis products, marihuana is usually administered through smoking. It can also be vaporized, eaten, or drunk as a tea. A person intentionally employing marihuana for the purpose of exploring the psyche may be called a \*psychonaut. For a discussion of the hallucinogenic properties of marihuana, see the entry Cannabis-induced hallucination.

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## Marine Bow

see Rainbow.

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## Mariotte's Spot

see Blind spot.

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## Mass Hallucinosis

see Epidemic hallucination.

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## Matrix of the Mind

see Dream screen.

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## Maudsley's Definition of Hallucinations and Illusions

In 1887 the British physician and professor of medical jurisprudence Henry Maudsley (1835–1918) defined hallucinations and illusions as follows: "By hallucination is meant such a false perception of sense as a person has when he sees, hears, touches, or otherwise apprehends as external, that which has no existence at all outside his consciousness, no objective basis – sees a person where there is no person, hears a voice where there is no voice. It is the creation of a fitting object of sense as cause of a special sensation where no such object is; and it takes place in accordance with the well-known physiological law that it is possible, by stimulating artificially the nerve-centres of perception, to produce the same kind of perception, and sometimes in quite as vivid degree, as the natural stimulus of the proper external object would occasion. When there is an external object which excites the perception, but the nature of it is mistaken – far the most common case – it is usual and useful to describe the effect as illusion, although it is not

possible in nature to draw a distinct line always between hallucination and illusion."

### Reference

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## Maupassant

see De Maupassant, Guy de.

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## Mayapple and Hallucinations

The mayapple is also known as American mandrake. Both names refer to *Podophyllum peltatum*, a plant indigenous to North America. Somewhat confusingly, the mayapple is also referred to as mandrake, a name traditionally reserved for the plant *Mandragora officinarum*. Although the literature on hallucinogenic substances contains myriad references to the mayapple, the plant contains no known psychoactive substances. As the German anthropologist and ethnopharmacologist Christian Rättsch (b. 1957) comments, "This example provides a clear illustration of the ways in which the psychological patterns that arise when a medicine is administered can be influenced and shaped by a person's culture."

### Reference

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## McCollough Effect

The eponym McCollough effect refers to the American scientist Celeste McCollough Howard, who described the concomitant phenomenon in 1965. The McCollough effect is classified as a \*contingent aftereffect. It can be induced by the alternate viewing of two gratings of different orientations (i.e. vertical and horizontal) and different colours (in the original paper by McCollough a vertical grating of blue and black stripes, and a horizontal grating of orange and

black stripes). After alternately viewing these gratings for various minutes, the test subject is confronted with another pattern of vertical and horizontal gratings, but this time in black and white. The McCollough aftereffect consists of the black and white gratings being seen in colours complementary to the coloured ones priorly perceived (i.e. the vertical stripes in yellowish and the horizontal ones in purplish). The McCollough effect is distinguished from the \*afterimage by the fact that the colours are contingent on the orientation of the gratings and by their tendency to last extremely long (i.e. up to 24 hours after an induction period of 10 min). The physiological correlates of the McCollough effect are still subject to debate. Hypotheses range from the involvement of the lateral geniculate nucleus to the involvement of cells within the visual cortex that are responsive to both colour and orientation, to the involvement of so-called higher centres of the CNS.

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### Mechanism Illusion

see Physiological illusion.

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### Megalopia

see Macropsia.

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### Megalopsia

see Macropsia.

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### Memory Flashback

see the entries Flashback, Experiential hallucination, and Reperceptive hallucination.

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### Memory Hallucination

Also known as hallucinatory memory, hallucination of memory, and memory illusion. The German expression *Halluzination der Erinnerung* was introduced in or shortly before 1866 by the German psychiatrist Karl Ludwig Kahlbaum (1828–1899) to denote a hallucination consisting of a re-enactment of a previously perceived object or scene (i.e. a \*reperceptive hallucination). In 1888 the term was used somewhat differently by the American idealist philosopher Josiah Royce (1855–1916), as a fantastic false memory that is conjured up retrospectively, so as to serve as a foreboding of a meaningful experience. He arrived at this concept by reflecting on the many cases of \*coincidental hallucinations listed in the book *Phantasms of the Living* by the British paranormal researchers Edmund Gurney (1847–1888), Frederic Myers (1843–1901), and Frank Podmore (1856–1910). Many of these coincidental hallucinations have a bearing on dead or dying individuals, experienced around their actual hour of death. As Royce asked himself, “Why should people who have no interest in believing in telepathy, who are themselves often despisers of the whole idea, and also haters of all superstitions, whose own personal honesty is undoubted, and whose memory is generally good – why should such people suddenly believe and relate that, at some very recent time, just before an affliction, or at the moment of a calamity, they knew, or were warned, by dream or presentiment, of the distant, and, for them, otherwise unknowable fact of the affliction or calamity in question?” Royce answered this question by suggesting that “in such cases we probably have to do with a not yet recognised type of *instantaneous hallucination of memory, existing in the fancy, at the very moment of some exciting experience, that one has expected it before its coming.*” The German psychiatrist and philosopher Karl Jaspers (1883–1969) distinguishes three criteria characteristic of hallucinations of memory as conceptualized by Royce. He suggests that the affected individual tends to be convinced that he or she had forgotten about the event, that the hallucinated memory is freshly created, and that it comes to the individual’s mind all of a sudden. Today Royce’s hallucination of memory is sometimes referred to as \*acute confabulatory psychosis. As the German hallucinations researcher Edmund Parish (1861–1916) points

out, Royce's use of the term hallucination in this context is disputable because it would not seem to refer to a perceptual experience. In 1886, 2 years before Royce's publication on the subject, the German psychiatrist Emil Kraepelin (1856–1926) referred to this phenomenon as *Erinnerungsfälschung* (memory deception), which is perhaps a more apt term. Kraepelin, in turn, had been inspired by the notion of *Erinnerungstäuschung* put forward by his compatriot Wilhelm Sander (1838–1922). With hindsight, the notions of hallucination of memory, *Erinnerungsfälschung*, and *Erinnerungstäuschung* are considered part of a conceptual tradition involving 'qualitative' memory disturbances called paramnesias.

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### Memory-Afterimage

The German term *Erinnerungsnachbild* (i.e. memory-afterimage) was introduced in or shortly before 1860 by the German psychologist Gustav Theodor Fechner (1801–1887) to denote an acute, lively, and often accurate recollection of an event one has failed to notice shortly before. Fechner gives the example of a question that is posed while our thoughts are elsewhere and then springs to mind as soon as we realize that it is we who are expected to answer it. A second example involves the striking of a clock which is noticed only when the striking is halfway through, after which it may be possible to count the previous strokes in one's memory. The memory-afterimage is classified as a type of \*imagery rather than as a percept. Conceptually as well as phenomenologically, it would seem to be related to the \*eidetic image.

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### Memory Illusion

A term used to denote a false memory rather than a perceptual phenomenon, characterized by a failure to distinguish accurately between an event that actually took place and one that was merely imagined or thought about. The term memory illusion is also used as a synonym for \*memory hallucination.

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### Mental Hallucination

see Psychic hallucination.

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### Mental Imagery

see Eidetic image.

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## Mental Synaesthesia

The term mental synaesthesia comes from the Latin adjective *mentalis* (of the soul, of the mind) and the Greek words *sun* (together, unified) and *aisthanesthai* (to notice, to perceive). The concept was introduced in or shortly before 1954 by the Hungarian-Dutch experimental psychologist Géza Révész (1878–1955) to denote a \*synaesthesia in which the secondary percept comes to mind when its name is suggested. Whereas synaesthesias in general consist of a hallucinated secondary percept triggered by a regular primary percept, mental synaesthesias consist of a hallucinated secondary percept (such as a hallucinated sound or colour sensation) triggered by its name. In other words, the term mental synaesthesia refers to a \*reflex hallucination elicited by the name of the issue featuring in that hallucination. It is used in opposition to the terms \*conceptual synaesthesia and \*perceptual synaesthesia.

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## Mentalia

see Psychalia.

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## Merleau-Ponty's Opinion on Hallucinations

In 1945 the French existentialist philosopher Maurice Merleau-Ponty (1907–1961) designated hallucinations as follows: "Since the hallucination is not a sensory content, there seems nothing for it but to regard it as a judgement, an interpretation or a belief... False perceptions are not perceptions at all. The victim of hallucinations cannot hear or see in the genuine sense of these words. He judges and believes that he sees or hears, but he does not really see or hear."

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## Mescaline and Hallucinations

Mescaline is known under many names, including mescal, peyote, peyotl, hikori, hikuli, huatari, seni, and wowoki. The names mescaline and mescal stem from *mezcal*, which is the Spanish name for the plant *Agave americana*, as well as for the distilled liquor (reminiscent of Tequila) that is made from it. The chemical substance mescaline, however, C<sub>11</sub>H<sub>17</sub>NO<sub>3</sub> or 3,4,5-trimethoxy-β-phenethylamine, is an alkaloid of the phenethylamine group which has significant \*hallucinogenic properties when administered in a sufficiently high dose (i.e. of the order of 5 mg/kg body weight when used orally). Using the criterion of psychoactive potential as a guiding principle, mescaline can be classified as a \*deliriant. The alkaloid mescaline has nothing to do with the agave and the distilled liquor. It is derived from the peyote cacti *Lophophora williamsii* and *L. diffusa*, the San Pedro cactus (*Echinopsis pachanoi*), the Peruvian torch cactus (*E. peruviana*), and numerous other cacti, as well as from the *Acacia berlandieri* and other members of the bean family (Fabaceae). It is traditionally won from the dried tops of the peyote cactus (i.e. the mescal beans or mescal buttons), but it can also be produced synthetically. It was first isolated and identified in 1897 by the German chemist and pharmacologist Arthur Heffter (1859–1925). In 1919 it was synthesized for the first time by the Austrian chemist Ernst Späth (1886–1946). Mescaline is administered either orally or subcutaneously, in the latter case in the form of a sulphate. It was added to psychiatry's repertoire of experimental substances during the 1920s. The German chemist Kurt Beringer (1893–1949) is well known for his pioneering work in this area of research, administering mescaline to healthy subjects (including himself) to evoke what he called model psychoses, in the hope that these might shed light upon the pathophysiology of the major psychotic disorders. In 1930 the German psychologists Konrad Zucker and Julius Zádor proposed a rather crude distinction between mescaline-induced \*primitive hallucinations and \*scenic hallucinations. The German-

American biological psychologist and philosopher Heinrich Klüver (1897–1979) was among the first to attempt a further systematization of the substance's psychotropic effects. The main site of action of mescaline is believed to be in the visual and visuo-associative areas of the cerebral cortex, possibly via the 5HT<sub>2</sub> or serotonin receptor. Its kaleidoscopic hallucinatory effects are sometimes designated as 'visual orgies'. Klüver divided these effects into five groups, comprising (1) \*visual hallucinations of varying complexity, (2) alterations in the vividness and saturation of colours in visual imagery (notably rapid colour changes and \*hyperchromatopsia, but also \*colour vision deficiencies, \*achromatopsia, the appearance of halos, an enhancement of contrast phenomena, and peculiar alterations in the hues and patterns of \*afterimages), (3) \*metamorphopsias (such as \*dysmegalopsia, \*macroproxiopia, \*akinetopsia, and \*micropsia), (4) \*visual experiences such as \**presque vu* and \*dual system experience, and (5) \*synaesthesias. In addition, Klüver distinguished four \*form-constants that would seem to constitute a kind of *Leitmotiv* for the visual imagery occurring during the initial stages of mescal intoxication. Klüver designates these form-constants as (1) grating, lattice, fretwork, filigree, honeycomb, or chessboard, (2) cobweb, (3) tunnel, funnel, alley, cone, or vessel, and (4) spiral. As he wrote, "Many phenomena are, on close examination, nothing but modifications and transformations of these basic forms." Although rare during the mescal state, the other sensory modalities can be affected as well. Mescaline is famous, for instance, for its ability to mediate \*kinaesthetic hallucinations (notably the sensation of flying). Especially in higher doses, mescaline is known for its disorienting effects in space and time (i.e. \*time distortions). The brightness of mescaline visions is often so intense that it calls forth a blinding sensation. In combination with the nausea and vomiting that may accompany the initial stages of mescaline intoxication (traditionally interpreted as signs of cleansing), these properties may have contributed to the drug's popularity among Indian tribes for use in their sacred rituals. Because of the spiritual connotations of these rituals, some authors prefer to designate mescaline as an \*entheogen rather than a hallucinogen. Mescaline trips are also known as *mescalitos*. A person intentionally employing mescaline for the purpose of exploring the psyche may be called a \*psychonaut.

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## Mescalism

A term used to denote the state of mescaline intoxication.

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## Mesencephalic Hallucinosi

The term mesencephalic hallucinosi is indebted to the Greek words *mesos* (middle) and *enkephalos* (that which is inside the head, i.e. the brain). It translates loosely as 'midbrain hallucination'. The term mesencephalic hallucination was proposed in 1937 in a posthumously published study by the Russian neuropsychologist and psychoanalyst Aron Borisovich Zalkind (1888–1936) to replace the older term \*peduncular hallucinosi.

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## Metamorphopsia

The term metamorphopsia comes from the Greek words *metamorphoum* (to change the form) and *opsis* (seeing). It translates roughly as 'seeing an altered form'. It is not clear who introduced the term, but it appears in a medical lexicon as early as 1858, while the phenomenon itself has been described for at least two millennia. Today the term metamorphopsia is used in a restricted sense to denote a visual distortion affecting the contours of objects. In a more general sense, it is used to denote a variety of qualitative visual distortions affecting the perceived form, size, orientation, colour, and/or speed of perceived objects. In both cases, the visual distortion can be either fleeting or long term. Metamorphopsia as defined in the broad sense is an extremely varied phenomenon that can be divided into multiple categories. These include \*achromatopsia (i.e. the inability or strongly diminished ability to perceive colour), \*akinetopsia (the inability to perceive motion), \*chromatopsia (seeing things in a single hue, as in \*cyanopsia (blue vision), \*chloropsia (green vision), \*erythroptopsia (red vision), \*ianothinopsia (violet or purple vision), and \*xanthopsia (yellow vision)), the \*corona phenomenon (in which an extra contour is visible around objects), \*dysmegalopsia (a diminished ability to appreciate the size of objects), \*dysmetropsia (characterized by changes in the apparent size and distance of objects), \*dysmorphopsia (in which lines and contours appear to be wavy), \*dysplatopsia (in which objects are perceived flattened and elongated), \*enhanced stereoscopic vision (an exaggeration of depth and detail of visually perceived objects), \*entomopia (seeing multiple identical images as if perceived through an insect's eye), \*gyropsia (seeing an illusory, circular movement), \*hemimetamorphopsia (in which only one half of an object or face appears distorted), \*illusory splitting (a visual distortion consisting of an apparent vertical splitting of objects), \*inverted vision (in which objects are perceived as if rotated 180°), \*kinetopsia (illusory movement), \*loss of stereoscopic vision (in which things appear two dimensional or 'flat'), \*macropsia (seeing things larger than they are), \*macroproxioptopsia (in which the perceived size and distance of objects is altered), \*micropsia (seeing things smaller than they are), \*microtelepsia (in which the perceived size and distance of objects is altered), \*mosaic

vision (characterized by the fragmentation of perceived objects or stimuli into irregular, crystalline, polygonal facets, interlaced as in a mosaic), \*pelopsia (in which objects appear to be closer than they are), \*plagiopsia (in which objects appear to be tilted), \*polyopia (seeing multiple identical copies of a single image), \*porropsia (in which stationary objects are seen as moving away from the observer), \*prosopometamorphopsia (in which faces appear to be distorted), \*teleopsia (in which objects appear to be further away than they are), \*visual allachaesthesia (in which objects are perceived as if dislocated into the opposite visual field), and \*visual perseveration (i.e. the illusory reoccurrence of visual percepts, as in \*illusory visual spread, \*palinopsia, and the \*trailing phenomenon). The Scottish philosopher Thomas Reid (1710–1796) is commonly credited with providing the first case report of metamorphopsia in 1764, after having contracted the condition himself due to a prolonged period of sunglasses. Reportedly, the Norwegian expressionist painter Edvard Munch (1863–1944) also suffered from metamorphopsias, caused by an intraocular haemorrhage. Cases of metamorphopsia due to a lesion of a single eye are referred to as \*monocular metamorphopsia. When metamorphopsias evoke changes in the affective assessment of the extracorporeal environment, rendering it either beautiful, ugly, or frightening, they are called \*complicated metamorphopsias. When such changes are absent the term \*simple metamorphopsia is used. Pathophysiologically, metamorphopsias are divided into two broad categories. Those attributable to an anomaly in the eye are referred to as peripheral or retinal metamorphopsias. Those attributable to a central anomaly are termed central, cortical, or cerebral metamorphopsias. Metamorphopsias tend to be transient or episodic in nature, especially when the underlying neurological condition is transient or episodic in nature. Some examples of these conditions are migraine, epilepsy, and the use of illicit substances such as mescaline or LSD. Metamorphopsias occurring in the context of an \*aura or a related seizure disorder are referred to as \*ictal illusion or \*ictal metamorphopsia. Long-lasting and permanent metamorphopsias are relatively rare. Pathophysiologically, they are associated primarily with discrete lesions affecting the visual association areas. Etiologically, they are associated primarily with structural damage, due, for example, to infarction, haemorrhage, or a neoplasm. Peripheral causes of meta-

morphopsias include retinal oedema (which can give rise to micropsia or dysmorphopsia) and retinal scarring (which can lead to macropsia). Metamorphopsias are commonly classified as \*sensory distortions.

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## Metamorphopsia for Faces

see Prosopometamorphopsia.

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## Methadone and Hallucinations

see Opioid-Induced hallucination.

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## Methamphetamine and Hallucinations

see Steroid psychosis and hallucinations.

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## Micropsia

Also known as micropsy, microptic vision, Lilliput sight, Lilliput vision, and lilliputianism, after the fictitious country featuring in the novel *Gulliver's Travels* by the Irish poet and author Jonathan Swift (1667–1745). The term micropsia comes from the Greek words *mikros* (small) and *opsis* (seeing). It refers to the visual perception of an object or stimulus that is apparently decreased in size. The process of reducing the apparent size of objects and stimuli is called \*minification. When micropsia sets in gradually rather than abruptly, it is referred to as \*zoom vision. When objects are repeatedly minified and magnified in the course of seconds, the term \*pulsation phenomenon applies. Micropsia can occur as an isolated \*physiological illusion, as an \*aura, or in the context of a cluster of symptoms called the \*Alice in Wonderland syndrome. The most common form of physiological (i.e. non-pathological) micropsia is \*convergence micropsia, a phenomenon attributed primarily to convergence of the eyes, as in squinting. It is classified as a physiological illusion. Micropsia can also occur in individuals wearing glasses with minus lenses. Pathological forms of micropsia are associated etiologically with conditions such as lesions to the right temporo-parietal cortex, migraine, epileptic seizures, macular oedema, optic chiasm lesions, infectious diseases, and intoxications with illicit substances such as cannabis, *Amanita muscaria*, mescaline, and LSD. In 1947, the Russian-American neurologist Morris Bender (1905–1983) and the German-American neuropsychologist Hans-Lukas Teuber (1916–1977) developed the hypothesis that micropsia may be due to an impairment of size constancy. Alternatively, psychodynamically oriented models tend to associate micropsia with a sense of separation from other people and/or the environment. The term \*hemimicropsia refers to a rare disorder of visual perception in which the perceived size of objects within one of the hemifields is reduced, while the size of those perceived in the other hemifield remains unaltered. Occurring in the context of pathology, micropsia can be classified as a type of \*dysmetropsia or as a \*metamorphopsia. The term micropsia is used in opposition to the term \*macropsia. It should not be confused with the notion of \*microptic hallucination. Neither should it be confused with \*teleopsia, in which objects appear further away than they actually

are. Conceptually, micropsia may be seen as the visual equivalent of \*microstereognosia (in which things feel smaller than they are). The two conditions have also been known to occur in conjunction with one another.

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## Micropsy

see Micropsia.

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## Microptic Hallucination

Also known as microscopic hallucination and diminutive visual hallucination. The term microptic hallucination is indebted to the Greek words *mikros* (small) and *opsis* (seeing). It refers to a type of \*visual hallucination in which the hallucinated object is perceived as disproportionately small in comparison with the 'background' of regular sense perceptions. A subtype of the microptic hallucination, characterized by the perception of disproportionately small human figures, is known as a \*lilliputian hallucination. Microptic hallucinations may present as an isolated symptom, as part of an \*aura, or as part of a cluster of symptoms called the \*Alice in Wonderland syndrome. Etiologically, they are associated with varying conditions such as epileptic seizures, migraine, \*delirium, \*delirium tremens, alcohol withdrawal, toxoplasmosis or typhoid infections, mesencephalic lesions, \*Charles Bonnet syndrome, and intoxication with \*hallucinogens such as LSD and mescaline. In individuals with a clinical diagnosis of

schizophrenia they would seem to be relatively rare. The term microptic hallucination is used in opposition to the term \*macroptic hallucination. It should not be confused with \*micropsia.

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## Microptic Vision

see Micropsia.

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## Microscopic Aura

The term microscopic aura comes from the Greek words *mikros* (small), *skopeō* (I am looking at), and *aura* (breeze, smell). It refers to a type of \*aura or 'warning symptom', occurring in the context of paroxysmal neurological disorders such as epilepsy and migraine, in which objects and stimuli in the environment are perceived as disproportionately small. The introduction of the French term *aura microscopique* has been attributed to the Swiss neurologist Otto Veraguth (1870–1944). The term is used in opposition to the term \*macroscopic aura.

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## Microscopic Hallucination

see Microptic hallucination.

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## Microsleep

A term introduced in or shortly before 1966 by the Russian-American neurophysiologist Wladimir Theodore Liberson (1904–1994) to denote a sleep state lasting for a short lapse of

time, typically a few seconds to a minute. The definition and diagnostic criteria of the microsleep tend to differ somewhat across authors, and consensus on how to assess them is lacking. Some authors assess microsleeps on the basis of clinical signs such as a blank stare, drooping eyelids, prolonged eye closure, hypnagogic jerks, unintended paroxysmal vocalizations, snoring, and cataplexy, whereas others rely on the electroencephalogram (EEG) to assess the microsleep. On the EEG, microsleeps are characterized by a lowering of alpha activity (i.e. the activity characteristic of the waking state) and the appearance of theta activity (associated with stage N1 sleep). Microsleeps can occur in any one person, especially in a warm and poorly ventilated environment, during the performance of monotonous tasks, and during times of the day when the brain is 'programmed' to enter the sleep state, such as the pre-dawn and mid-afternoon hours. The incidence of microsleeps tends to be heightened in individuals suffering from conditions such as \*sleep deprivation, physical or mental fatigue, the sleep apnea syndrome, and narcolepsy. During microsleeps the affected individual may enter the \*dream state or the hypnagogic state virtually without a threshold, and without being aware of a discontinuity in the perceptual and cognitive state. This may entail the experiencing of dream images or \*hypnagogic hallucinations, and lead up to life-threatening situations in individuals operating a machine or vehicle, for example. It is not unthinkable that the \*daymare (i.e. the daytime equivalent of the classical \*nightmare) and the microsleep have certain neurophysiological correlates in common.

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*gnōsis* (insight). It translates roughly as 'experiencing the body as smaller'. The term was introduced in or shortly before 1963 by the Dutch neurologist Joseph Antonius Maria Frederiks to denote a disorder of the body scheme in which the body, in part or in whole, is experienced as disproportionately small. When the whole body is involved, the expressions \*whole body microsomatognosia and total body microsomatognosia may be used. When the condition is restricted to one or more parts of the body, the term \*partial microsomatognosia may be used. The phenomenon itself was described as early as 1905 by the French neurologist Pierre Bonnier (1861–1918), in the context of \*aschematia. Frederiks lists three general characteristics of microsomatognosia, i.e. (1) its paroxysmal character, (2) its occurrence in both halves of the body, and (3) its occurrence in the unclouded mind. Microsomatognosia may present as an isolated symptom, as part of an \*aura, as part of a cluster of symptoms called the \*Alice in Wonderland syndrome, or as part of the cluster of symptoms designated as \*schizophrenia. Etiologically, it is associated with a variety of conditions, including epileptic seizures, migraine, \*delirium, \*delirium tremens, alcohol withdrawal, toxoplasmosis or typhoid infections, mesencephalic lesions, and intoxication with \*hallucinogens such as LSD and mescaline. Microsomatognosia may also occur as a transient phenomenon during \*hypnagogic states. The condition is generally classified as a \*body schema illusion or as a type of somatognosia. The term microsomatognosia is used in opposition to \*macrosomatognosia.

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### Microstereognosia

Also known as microstereognosis. Both terms stem from the Greek adjective *mikros* (small), and the medical term stereognosis (from the Greek words *stereos* (solid, tight, compact) and

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### Microsomatognosia

The term microsomatognosia comes from the Greek words *mikros* (small), *sōma* (body), and

*gnōsis* (insight)), meaning the ability to identify solid objects through the tactile sensation. The term microstereognosia was introduced in or shortly before 1945 by the Jewish neurologist Lipman Halpern to denote a tactile \*illusion in which an object (held in the palm of one's hand, for example) appears to be significantly smaller than it is. The term is used in opposition to \*macrostereognosia. Pathophysiologically, both conditions are associated primarily with thalamic dysfunction, and with mild parietal sensory impairment. Conceptually, microstereognosia may be seen as the tactile equivalent of \*micropsia (i.e. seeing things as smaller than they are). The two conditions have also been known to occur in conjunction with one another.

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## Microstereognosis

see Microstereognosia.

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## Microtelepsia

The term microtelepsia comes from the Greek words *mikros* (small), *tèlè* (far), and *opsis* (seeing). It refers to a variant of \*dysmetropsia in which the perceived size and distance of objects is altered, in the sense that objects are perceived as smaller and further away than they are. Microtelepsia may present as an isolated symptom, as part of an \*aura, or as part of a cluster of symptoms called the \*Alice in Wonderland syndrome. Etiologically, it is associated with a variety of conditions, including epileptic seizures, migraine, \*delirium, \*delirium tremens, alcohol withdrawal, toxoplasmosis or typhoid infections, mesencephalic lesions, and intoxication with \*hallucinogens such as LSD and mescaline.

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## Migraine Aura

The term migraine comes from the Old English *megrim*, which is in turn indebted to the Greek noun *hèmikranion* (meaning half the skull). The introduction of the term *hèmikranion* is attributed to the classical physician Galen of Pergamum, born as Claudius Galenus (129–c. AD 216). Today migraine is conceptualized as a primary neurological syndrome, typically (although not invariably) responsible for a moderate to severe unilateral headache with a pulsating quality, which may be accompanied by symptoms such as nausea, vomiting, \*photophobia, and \*hyperacusis. The term \*aura is Greek for wind or smell. The term migraine aura is used to denote any neurological sign or symptom that may accompany either the development phase of a migraine attack or the migraine attack itself. It may or may not be followed by a migraine headache. An early description of a visual migraine aura can be found in the Hippocratic Corpus, written around 400 BC. A migraine aura occurs in 10–40% of all individuals acquainted with migraine. As migraine itself has a lifetime prevalence of 12–28%, it has been suggested that the visual migraine aura constitutes the most prevalent type of visual hallucination. The two most prevalent variants of migraine with visual aura are called migraine with aura (the approved term of the World Federation of Neurology for what was formerly known as classic migraine) and migraine aura without headache (formerly known as *migraine accompagnée* and acephalgic migraine). The spectrum of neurological signs and symptoms that may occur in the context of a migraine aura includes \*phosphenes, coloured \*photopsia patterns, \*fortification spectra (also referred to as positive visual auras), \*scotomata, \*quadrantanopsia, \*hemianopia, tunnel vision, \*amaurosis fugax (also referred to as a negative

visual aura), ophthalmoplegia, oculosympathetic palsy, \*diplopia, monocular crescent, mydriasis, digito-lingual or cheiro-oral \*paraesthesias, heaviness of the limbs, hemiparesis, vertigo, difficulty reading or writing, aphasia, dysphasia, dysarthria, and brain stem symptoms. In addition, various types of \*metamorphopsia may occur, such as \*dysmegalopsia, \*macroproxiopia, \*microtelepsia, \*pelopsia, \*micropsia, and \*macropsia. Relatively rare phenomena occurring in the context of migraine aura are \*macro- and \*microsomatognosia, in which one's own body, in part or in whole, is perceived as being disproportionately large or small. These metamorphoptic symptoms may cluster in such a way that they fulfil the criteria of the \*Alice in Wonderland syndrome. In the context of the migraine aura, complex visual hallucinations have also been reported, including \*lilliputian and \*gulliverian hallucinations. The migraine aura tends to appear gradually over 5–20 min, and to last no longer than 60 min. There are many types and patterns of visual aura, but many of these start with the homonymous appearance of fortification spectra, which then surround or define an area of scotomatous visual loss (also referred to as a scintillating positive scotoma). These scotomata may be bordered by coloured photopsia patterns. Scotomata often move from an area adjacent to the fixation point out to the periphery. The temporal sequences of signs and symptoms in migraine aura are referred to as a 'march'. They are indicative of an underlying spreading disturbance of cerebral cortical areas, typically at a speed of 2–3 mm/min. The concomitant concept, called the spreading depression concept, was developed in or shortly before 1944 by the Brazilian biologist Aristides Azevedo Pacheco Leão (1914–1993). A competing concept, referred to as the vascular concept, was developed by the American biologist and philosopher Harold George Wolff (1898–1962). Various clinical and experimental findings support the vascular concept, especially as regards the quality of the pain characteristic of the migraine headache. And yet the spreading depression concept would seem to be better equipped to explain the creeping, epileptiform patterns of cerebral dysfunction characteristic of the migraine aura. In an effort to combine the strengths of both concepts, some authors have advocated what they call a unification theory of the migraine aura.

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## Mindblindness

Also known as psychic blindness, soulblindness, and visual agnosia. All four terms are used to denote the inability or diminished ability to process certain aspects of the visual input, resulting, for example, in the inability to recognize faces (i.e. prosopagnosia), objects, or situations. The German term *Seelenblindheit* (i.e. soul blindness) was coined in or shortly before 1881 by the German physiologist Hermann Munk (1839–1912) to denote a condition induced experimentally in dogs by surgically removing parts of the visual cortex. Munk's discovery was applied clinically to the human situation by the German neurologist Heinrich Lissauer (1861–1891). Traditionally, mindblindness is attributed to lesions and/or malfunctioning of areas within the occipital cortex. Lissauer proposed a distinction between apperceptive and associative mindblindness. Apperceptive mindblindness was conceptualized by him as the inability to integrate various visual elements into a single, coherent whole or percept. Associative mindblindness was envisaged by him as the inability to integrate a visual percept with information from the other sensory modalities, thus leading to a failure of prelinguistic object representation. A second and rather different connota-

tion of the term mindblindness was introduced in or shortly before 1990 by the British neuroscientist Simon Baron-Cohen. Baron-Cohen uses the term to designate the autistic lack of a theory of mind.

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### Mind Pain

see Algospychalia.

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### Miniaturization

see Minification.

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### Minification

Also known as perceptual minification. Both terms are indebted to the Latin adjective *minus*, which means smallest. They are used to denote the process by which visually perceived objects or stimuli appear to decrease in size. Minification can occur either physiologically (as in \*convergence micropsia) or in the context of pathology. In the latter case, it is associated etiologically with conditions such as lesions to the right temporo-parietal cortex, migraine, epileptic seizures, macular oedema, optic chiasm lesions, infectious diseases, and intoxications with illicit substances such as cannabis, *Amanita muscaria*, mescaline, and LSD. When minification sets in gradually rather than abruptly, it is called \*zoom vision. When objects are repeatedly minified and magnified in the course of seconds, the term \*pulsation phenomenon applies. Sometimes the term miniaturization is used as a synonym for minification, but the term miniaturization is properly applied to the process of making an object physically smaller rather than making it appear smaller. The term minification is used in opposition to the term \*magnification.

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### Minor Hallucination

The term minor hallucination is indebted to the Latin adjective *minor*, which means smaller, younger, the youngest. It is used to denote a \*sensory deception that does not fulfil the criteria of a \*hallucination proper, such as a \*hallucinoid or illusory phenomenon. Some phenomena classified as minor hallucinations are \*sensed presence, \*passage hallucinations, and \*cognitive illusions. Minor hallucinations can occur in healthy individuals, but they are also associated with a variety of psychiatric and neurological conditions, including narcolepsy, Parkinson's disease, and the use of illicit substances such as cannabis, *Amanita muscaria*, mescaline, and LSD.

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### Mirage

The term mirage comes from the French verb *se mirer*, which means to reflect or to be reflected. It is unknown who introduced the term. It appears in the title of a paper by the French physicist Gaspard Monge, Comte de Péluse (1746–1818), who described the phenomenon in 1799 on the basis of observations made during a 30-day expedition to Egypt with the army of Napoleon Bonaparte (1769–1821). While Monge mentions the term in passing, which suggests that it was well known at the time, his paper would seem to be the oldest known scientific document in which it appears. The phenomenon itself has been known and described since ancient times. Today

mirage is used as an umbrella term for a group of \*physical illusions attributed to differences in the refractive index of the atmosphere, which are in turn attributed to differences in temperature between adjacent layers of air. The mirage is defined by the American Meteorological Society (AMS) as “a refraction phenomenon wherein an image of some distant object is made to appear displaced from its true position because of large vertical density variations near the surface; the image may appear distorted, inverted, or wavering.” Especially in calm weather, the interface between warm and cold air near the surface of the ground or water may act as a refracting lens, bending light rays from the sky, and thus producing an image of a distant object or group of objects. These objects appear in an erect or an inverted position, and they may or may not appear disproportionately large or distorted. How it is possible that long-distance mirages – representing a city, a boat or a mountain, hundreds or even a thousand miles away – can be perceived without any diminution in the object’s apparent size is not fully understood. Like other physical illusions, mirages are objective \*illusions which can be perceived by any person in possession of adequate visual acuity, and which can also be photographed. Mirages are commonly classified as \*inferior mirage, \*superior mirage, and \*double mirage. The inferior mirage is one with a relative position below a perceived distant object or the horizon. Some examples of inferior mirages are desert mirages and \*highway mirages, which may both present in the form of distant pools of water, oil, or blue sky covering the surface of the ground. Inferior mirages tend to be unstable and to vanish as one approaches. They may be vibrating, vertically extended (i.e. ‘towering’), or flattened (i.e. ‘stooping’). The term superior mirage refers to one with a relative position above a distant object or the horizon. The resulting image is attributed to the presence of relatively hot air over a cold surface. Superior mirages, also known as arctic mirages, may present in the form of erect or inverted images, or a combination of the two, depending on the distance of the perceived object and the temperature gradients involved. When various temperature layers are present, mirages may merge, sometimes giving rise to multiple images. The term double mirage refers to a combination of the superior and inferior mirages. This type of mirage is less common. An even rarer type is the \*lateral mirage, in which a distant object is

perceived as if it were displaced sideways. The term \*fata morgana is used to denote a superior mirage with a relatively high complexity. Mirages can appear deceptively realistic, as witness the 1913 Crocker Land Expedition, undertaken to map and explore a landmass referred to as Crocker Land, which was characterized at the time as “the world’s last geographical problem”. The expedition, organized by the American explorer Donald Baxter MacMillan (1874–1970), and sponsored by the American Museum of Natural History, the American Geographical Society, and the University of Illinois’ Museum of Natural History, was unsuccessful, in the sense that Crocker Island turned out to be an illusory landmass inferred from a recurring mirage. Conceptually and phenomenologically, the mirage should not be confused with the \*desert hallucination, which has a propensity to occur during the night.

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### Mirror Hallucination

see Autoscopic hallucination.

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### Mirror Sign

Also known as *signe du miroir* and Capgras syndrome for the mirror image. All three terms are used to denote the inability to recognize oneself in a reflecting surface such as a window or a mirror, while the ability to recognize others in such reflecting surfaces is typically intact, as is



the ability to recognize oneself in a photograph or a painting. The mirror sign can be classified as a symptom (more specifically, a delusional misidentification symptom) occurring in the context of \*mirrored self-misidentification, which itself constitutes a type of \*misidentification syndrome. However, competing classifications have also been proposed. The expression *signe du miroir* was introduced in or shortly before 1927 by the French psychiatrist Paul Abely to denote the need or urge to examine oneself for prolonged and frequent periods in front of a reflecting surface. Abely was under the impression that the mirror sign occurred chiefly in individuals with a clinical diagnosis of dementia praecox and that the affected individual often appeared to be conversing with the image in the mirror. Moreover, Abely speculated that the mirror sign might be a manifestation of narcissism and/or a tendency towards homosexuality. Individuals displaying a mirror sign in the context of Alzheimer's disease may nevertheless act as if they recognize themselves and make use of mirrors and other reflective surfaces to comb their hair, for instance. The prevalence of the mirror sign in individuals with Alzheimer's disease has been reported to be between 2 and 22%. The symptom has also been recorded in association with \*post-traumatic stress disorder (PTSD), vascular dementia, and psychotic disorders. Pathophysiologically, the mirror sign can occur in the absence of a demonstrable CNS lesion. When discrete CNS lesions are present, they are typically located in the right hemisphere. They can also present in the form of mild, diffuse, bilateral CNS changes, such as atrophy and periventricular white matter changes. Conceptually, the mirror sign should not be confused with the notions of mirror agnosia (which is characterized by 'reaching into' the mirror, as in neglect) and \*mirror hallucination (which is a synonym for the term \*autoscopic hallucination).

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### Mirrored Self-Misidentification

A term that refers to a \*misidentification syndrome in which the affected individual is unable to identify his or her mirror image as oneself. The concomitant staring behaviour in front of a mirror or other reflecting surface is referred to as the \*mirror sign. Theoretically, mirrored self-misidentification may be at once delusional and illusory in nature. For example, individuals with a clinical diagnosis of Alzheimer's disease may attempt to converse with their mirror image and ask why that person is being held prisoner or become annoyed at the idea of being followed by the person they perceive in the mirror. A related – but extremely rare – phenomenon is \*negative autoscopia, characterized by the failure to perceive one's mirror image while looking into a mirror.

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### Misattribution of Inner Speech

see Inner speech model for verbal auditory hallucinations.

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### Misidentification Syndrome

Also known as delusional misidentification syndrome. Both terms are used as an umbrella term for a diverse group of conditions in which the affected individual consistently misidentifies a person, object, place, or event. The symptoms and syndromes included in the misidentification syndrome tend to vary somewhat in different classifications. Four subtypes are commonly distinguished, i.e. the \*phantom boarder

syndrome (which involves the imagined or hallucinated presence of one or more persons in the home of the affected individual); \*mirrored self-misidentification (i.e. the inability to recognize oneself in a reflecting surface); misidentification of other persons (as in prosopagnosia, \*intermetamorphosis syndrome, \*Capgras' syndrome, \*Frégoli's phenomenon, and the \*syndrome of subjective doubles); and the \*TV sign (in which the affected individual imagines the events on television as occurring in external, three-dimensional space). Other syndromes included under the heading misidentification syndrome are the \*magazine sign (in which people or objects in magazines are treated as if they were present in the affected individual's home), the \*picture sign (in which persons depicted in portraits are treated as present in the individual's home), the syndrome of subjective doubles (in which the affected individual believes that he or she has a \*doppelgänger or \*double living a separate life), clonal pluralization of the self (in which the affected individual believes that multiple copies of himself or herself exist, which are identical both physically and psychologically), reduplicative paramnesia (involving the conviction that a familiar person, place, or object has been duplicated), and the syndrome of delusional companions (i.e. the belief that toys or other objects are sentient beings). Misidentification syndromes are traditionally associated with psychiatric disorders such as \*psychotic and affective disorders, but also with organic brain conditions such as viral encephalitis, Alzheimer's disease, and other types of dementia. Although they may occur in the absence of any demonstrable pathology of the brain, it has long been suspected that disorders belonging to the misidentification syndrome must have discrete neuroanatomical correlates, tentatively located in the right hemisphere. Evidence emerging from neuroimaging studies indicates that various discrete brain regions do indeed play a key role in their mediation. These candidate regions include the right fusiform gyrus (believed to play a major role in the identification of faces), the parahippocampal place area (believed to play a similar role in the identification of places), and the anterior middle and inferior temporal gyri (associated with long-term memory and mechanisms for the retrieval of memorized information). In some classifications, conditions characterized by misidentification as well as reduplication are referred to as delusional reduplication syndromes. It is open to

debate whether these two groups of conditions are worthy of the predicate 'syndrome'. They are more like umbrella terms for a group of separate symptom clusters which have as their common denominator the fact that they lie on a continuum of anomalies of familiarity. It is equally open to debate whether these separate syndromes are primarily illusory or delusional in nature. In psychiatric classifications they tend to be relegated to the group of monothematic delusions. And yet in some instances, hallucinatory or at least illusory perception would seem to play a role. As early as 1866, the German psychiatrist Karl Ludwig Kahlbaum (1828–1899) described various misidentification syndromes, which he designated as *Sinnesdelirien* (i.e. \*delirium of the senses) and which he relegated to the class of \*illusions. Conversely, the German psychiatrist and neurologist Arnold Pick (1851–1924), whose concept of reduplicative paramnesia signalled a growing interest in cases of misidentification around the *fin de siècle*, regarded them as disorders of memory.

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### Misperception

see Sensory deception.

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**Mist Bow**

see Rainbow.

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**Mock Moon**

see Halo.

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**Mock Sun**

see Halo.

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**Monday Morning Syndrome**

see Erythrospia.

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**Monition**

The term monition comes from the Latin noun *monitio*, which means advice or warning. It was introduced in or shortly before 1922 by the French physiologist and Nobel Prize laureate Charles Robert Richet (1850–1935) to replace various older terms such as \*veridical hallucination, \*true hallucination, and \*telepathic hallucination, which all suggest a relation between the percepts in question and events taking place in the extracorporeal world. His reasoning was that, in spite of their reference to a coincidence with actual events, they have a connotation of subjectivity and morbidity. As he argues, “I intentionally do not use the word ‘hallucination,’ even qualified by the epithets ‘veridical,’ ‘telepathic,’ or ‘symbolical.’ It seems to me that the term ‘hallucination’ should be reserved to describe a morbid state when a mental image is exteriorized without any exterior reality.” Richet distinguishes three types of monitions, which he designates as monitions on trivial or serious matters other than death, monitions of death, and collective monitions (i.e. those observed by several individuals simultaneously, as in \*collective hallucinations). Today the term monition is used in parapsychology to denote a warning or revelation of a past or present event, received by other than the regular senses. The term monition of approach is

used to denote an unaccountable idea or image of an impending meeting with some other person. Monitions and monitions of approach are typically experienced in the form of an intuitive feeling, thought, or message-bearing hallucination. They are commonly auditory and/or visual in nature.

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**Monition of Approach**

see Monition.

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**Monochromatism**

see Achromatopsia.

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**Monochromatopsia**

see Achromatopsia.

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**Monocular Complex Hallucination**

see Monocular hallucination.

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**Monocular Diplopia**

see Diplopia monocularis.

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**Monocular Hallucination**

Also known as monocular complex hallucination. Both terms are indebted to the Greek *monos* (only) and the Latin *oculus* (eye). The term monocular hallucination was introduced in or shortly before 1936 by the Swiss neurologist

Georges de Morsier (1894–1982) to denote a rare type of \*complex visual hallucination that can be suppressed by the covering of one eye, especially in individuals with poor visual acuity or \*blindness in the other (i.e. uncovered) eye. The suppression of these hallucinations by closure of the blind eye has also been reported. In either case the adjective monocular refers to the effect of the covering or closing of a single eye rather than the occurrence of hallucinations in the visual field of a single eye. The German ophthalmologist Wilhelm Uththoff (1853–1927) is commonly credited with having been the first to describe this phenomenon in 1899. Pathophysiologically, monocular hallucinations are attributed to combined retrobulbar and CNS lesions similar to those in \*Charles Bonnet syndrome. Etiologically, they are associated primarily with \*delirium tremens. Other conditions in which monocular hallucinations have been described include neurodegenerative disorders, vascular CNS lesions, CNS trauma, neoplasms, intoxications, and epilepsy. The monocular hallucination should not be confused with the \*closed-eye hallucination, which can be evoked rather than terminated by the closing of the eyes.

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### Monocular Metamorphopsia

The term monocular metamorphopsia comes from the Greek *monos* (only), the Latin *oculus* (eye), and the Greek words *metamorphoun* (to change the form) and *opsis* (seeing). It is used to denote a type of \*metamorphopsia (i.e. a visual distortion) limited to a single eye. Monocular

metamorphopsia is classified as a peripheral or retinal type of metamorphopsia. Pathophysiologically, it is associated primarily with ocular pathology.

#### Reference

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### Mood Disorder and Hallucinations

The term mood disorder refers to a psychiatric disorder characterized by a prominent mood disturbance, i.e. a manic, depressed, or mixed state. The two prime examples of mood disorder are bipolar disorder and unipolar depressive disorder. Ever since the ground-breaking classificatory work of the German psychiatrist Emil Kraepelin (1856–1926), mood disorders and psychotic disorders have been conceptualized as separate, and more or less independent nosological entities. Nevertheless, it is estimated that at sometime in their lives 50–70% of the individuals diagnosed with a mood disorder experience psychotic symptoms. Hallucinations occurring in the context of a mood disorder have been reported in 12–15% of these individuals. In a study among 549 individuals with a clinical diagnosis of a mood disorder, the German psychiatrists Christopher Baethge et al. found a cross-sectional prevalence of hallucinations amounting to 5.89% in individuals with unipolar depression, 10.5% in individuals with bipolar depression, 11.2% in individuals with bipolar mania, and 22.9% in mixed states. The nature of these hallucinations was \*auditory (67.7%, the majority of which consisted of \*verbal auditory hallucinations), \*tactile/\*somatic (29.2%), and \*visual (26.2%), although hallucinations in the other sensory modalities were also reported. Hallucinations occurring in the context of mood disorders typically present in the form of \*mood-congruent hallucinations, although they can also be \*mood incongruent in nature.

#### References

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teristics and comparison to unipolar depression and schizophrenia. *Bipolar Disorders*, 7, 136–145.

Goodwin, F.K., Jamison, K.R. (1990). *Manic-depressive illness*. Oxford: Oxford University Press.

## Reference

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## Mood-Congruent Hallucination

A term used to denote a type of hallucination displaying a content that is consistent with the affected individual's mood. The term mood-congruent hallucination is used primarily in the context of the descriptive pathology of mood disorders, where the depressive state may be accompanied by hallucinations symbolizing feelings of guilt, death, disease, worthlessness, or despair, and the manic state by hallucinations symbolizing feelings of grandiosity, inflated self-esteem, and power. The term mood-congruent hallucination is used in opposition to \*mood-incongruent hallucination. Both types of hallucination tend to be of an \*auditory, \*bodily, or \*visual nature.

## Reference

Kaplan, H.I., Sadock, B.J. (2007). *Kaplan and Sadock's synopsis of psychiatry: Behavioral sciences/clinical psychiatry. Tenth edition*. Baltimore, MA: Lippincott Williams & Wilkins.

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## Mood-Incongruent Hallucination

A term used to denote a type of hallucination displaying a content that is inconsistent with the affected individual's mood. The term mood-incongruent hallucination is used primarily in the context of the descriptive pathology of mood disorders, where the depressive state may occasionally be accompanied by hallucinations that do not symbolize the usual feelings of guilt, death, disease, worthlessness, or despair, and the manic state may occasionally be accompanied by hallucinations that do not symbolize the usual feelings of grandiosity, inflated self-esteem, and power. The term mood-incongruent hallucination is used in opposition to \*mood-congruent hallucination. Both types of hallucination tend to be of an \*auditory, \*bodily, or \*visual nature.

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## Moon Illusion

Also known as Moon-size illusion and horizon illusion. All three terms refer to the Moon's apparently increased size when it approaches the horizon, in comparison with its perceived size when it is in the zenith. The ratio of this apparent increase in size lies around 2, although larger ratios (referred to as 'super illusion') have also been documented. This \*size illusion is not restricted to the Moon. As it is also known to occur in relation to the Sun and other heavenly bodies, the generic term for this type of \*illusion is \*celestial illusion. It has been suggested that the apparent increase in the size of celestial bodies approaching the horizon was known as far back as prehistoric times, and that it was registered in written form as early as the seventh century BC by the Assyrians. In his book *Meteorology*, the Greek philosopher Aristotle (384–322 BC) speaks of "the sun and stars which at their rising and setting appear larger than at the meridian." Since Aristotle, this phenomenon has been described and analysed by numerous authors. Until the 19th century, the \*Sun illusion would seem to have attracted more interest than the Moon illusion. However, today the Moon illusion is generally considered the archetypal representative of the group of celestial illusions. Throughout history, perhaps a 100 different explanations for the mediation of celestial illusions have been put forward. Starting with Aristotle, they have long been attributed to atmospheric mechanisms (referred to as the optical or atmospheric refraction hypothesis). As a corollary, celestial illusions were for a long time designated as \*physical illusions (i.e. illusions stemming from physical rather than physiological or psychological mechanisms). Another classical explanation, called the size contrast hypothesis, involves the relative proportions of distant objects (such as mountains or buildings) and celestial bodies perceived in their proximity. To this day, the mediation of the Moon illusion has not been fully explained. It has been suggested that size contrast may account for some 40% of the illusion, and that oculomotor com-



**Fig. 3** Moon illusion. Illustration by JDB

mands, angle of regard, and body posture may attribute another 10%. An additional proportion of unknown size is attributed to conflicting spatial representations in different visual pathways (i.e. the \*corollary discharge hypothesis). A competing theory suggests that the Moon's \*magnification at the horizon may be largely due to \*oculomotor macropsia, a macropsia illusion occurring when objects at a distance of 1 m or more are observed while the eyes remain in their resting focus (i.e. dark focus) position, meaning that they are focused at a distance of about 1 m. In short, it is still uncertain whether the Moon illusion should be regarded as a \*physiological

illusion, a \*cognitive illusion, or possibly a combination of the two.

### References

- Aristotle (1984). *Meteorology*. In: *The complete works of Aristotle. The revised Oxford translation. Volume 1*. Edited by Barnes, J. Princeton, NJ: Princeton University Press.
- McCready, D. (1985). On size, distance and visual angle perception. *Perception & Psychophysics*, 37, 323–334.
- Ross, H., Plug, C. (2002). *The mystery of the moon illusion. Exploring size perception*. Oxford: Oxford University Press.

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### Moonblink

see Nyctalopia.

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### Moon-Size Illusion

see Moon illusion.

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### Moore's Lightning Streaks

The eponym Moore's lightning streaks refers to a subclass of the group of \*phosphenes characterized by brief, vertical flashes of light in the temporal field of one eye, typically occurring in the dark, and typically elicited by acceleration of the eye or the head. Moore's lightning streaks are traditionally classified as \*entoptic phenomena. They tend to be attributed to vitreous traction. The eponym Moore's lightning streak was coined in or shortly before 1941 by the American ophthalmologist Frederick Herman Verhoeff (1874–1968), in honour of his British colleague Robert Foster Moore (1878–1963), who had described the concomitant phenomenon in 1935. Conceptually and phenomenologically, Moore's lightning streaks are considered closely akin to the \*fiery rings of Purkinje and the \*flick phosphene.

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**References**

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- Verhoeff, F.H. (1941). Moore’s subjective “lightning streaks”. *Transactions of the American Ophthalmological Society*, 39, 220–226.

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**Moreau de Tour’s Definition of Hallucinations**

In an essay by the French alienist Jacques-Joseph Moreau de Tours (1804–1884), published posthumously in 1899, hallucinations are defined as follows: “The hallucination, like all other delirious phenomena, belongs to the dream-life; *it is the sensation of the dream state*, reproduced during the waking state.”

**Reference**

- Moreau de Tours, J.-J. (1899). *Quelques notes sur les hallucinations*. Paris: Société d’Éditions Scientifiques.

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**Morpheus**

The name Morpheus is related to the Greek noun *morphè*, which means form. In Greek mythology, Morpheus was considered the most powerful god of \*dreams. He was known as a brother (or son, in an alternative version) of Hypnos, the god of sleep. Being one of the \*Oneiroi, he was considered a ruler of \*visions. The powers attributed to Morpheus are either the shaping of human forms in dreams or the creation of the dream as a whole.

**References**

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- Roscher, W.H. (1972). *Ephialtes. A pathological-mythological treatise on the nightmare in classical Antiquity*. Translated by O’Brien, A.V. In: *Pan and the nightmare*. Edited by Hillman, J. Dallas, TX: Springfield Publications.

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**Morphine and Hallucinations**

see Opioid-induced hallucination.

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**Morphopsia**

The term morphopsia comes from the Greek words *morphè* (form) and *opsis* (seeing). It is used in a restricted sense to denote a multicoloured \*complex visual hallucination with \*microptic or \*macroptic aspects. Pathophysiologically, this type of hallucination has historically been associated with lesions affecting the visual pathways of the temporal lobe. In a broader sense, the term morphopsia is used as a synonym for \*formed visual hallucination. In the latter sense, it is used in opposition to the term \*photopsia.

**Reference**

- Lhermitte, J. (1959). *Les hallucinations dans leurs relations avec les lésions du lobe occipital*. Paris: Masson et Cie., Éditeurs.

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**Mosaic Illusion**

see Mosaic vision.

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**Mosaic Vision**

Also known as mosaic illusion and geometrizing illusion. The term mosaic vision was introduced in or shortly before 1970 by the British neurologist Oliver Wolf Sacks (b. 1933) to denote a visual distortion characterized by the fragmentation of perceived objects into irregular, crystalline, polygonal facets, interlaced as in a mosaic. These facets can take on various sizes and forms, typically covering the whole field of vision. As Sacks observes, “The size of the facets may vary greatly. If they are extremely fine, the visual world presents an appearance of crystalline iridescence or ‘graininess,’ reminiscent of a pointillist painting. If the facets become larger, the visual image takes on the appearance of a classical mosaic, or even a ‘cubist’ appearance. If they compete in size with the total visual image, the latter becomes impossible of recognition, and a peculiar form of



**Fig. 4** Morpheus and Iris. Oil painting (1911) by Baron Pierre-Narcisse Guérin. Source: Hermitage Museum, Saint-Petersburg





**Fig. 5** Mosaic vision. Illustration by JDB

visual agnosia is experienced.” It is also noted by Sacks that “typically there is movement – a continually changing of scales – and often, simultaneously, an admixture of several scales”. Etiologically, mosaic vision is associated primarily with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy. The pathophysiology of mosaic vision is basically unknown. However, it has been suggested that it may share certain mechanisms of activation of visual representation with those involved in the mediation of \*geometric hallucinations. Mosaic vision is commonly classified as a \*metamorphopsia, which is itself classified as a \*sensory distortion. The notion of mosaic vision should not be confused with the notion of \*tessellospsia.

#### References

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- Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.

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#### Mother Ann

see Lee, Ann.

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#### Mother Ann Lee

see Lee, Ann.

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#### Motion Aftereffect (MAE)

A term used to denote a type of \*aftereffect characterized by illusory motion. The American experimental psychologists George Mather et al. define the MAE as “the illusory movement of a physically stationary scene following exposure to visual motion”. The Greek philosopher Aristotle (384–322 BC) has been credited with providing the oldest known description of an MAE (more specifically, the \*river illusion, which is considered phenomenologically similar to the \*waterfall

effect) in his book *Parva Naturalia*. MAEs typically occur after viewing a moving pattern for a prolonged period of time and then shifting one's gaze to a stationary background. That background then appears to move in the opposite direction. This order of events is interpreted as an indication that it is possible for the motion-sensitive cells within the visual system to adapt to movement, while the position-sensitive cells remain unaffected. The neurophysiological correlates of the MAE are not fully understood. It has been suggested that at least two types of mechanisms may be responsible for their mediation, i.e. a peripheral mechanism capable of mediating monocular MAEs, and a central mechanism capable of mediating the interocular transfer of MAEs, which may result in the binocular perception of illusory movement. Some models of physiological motion detection attribute the mediation of centrally evoked MAEs to the adaptation of single cells or cell columns within the visual cortex (striate as well as extrastriate) to the specific type of movement involved. A competing set of models, known by the umbrella term 'ratio model', attribute the mediation of MAEs to multiple gain controls, exerted by various parts of the visual system. A third hypothesis is known as the recurrent inhibition model. The MAE is commonly classified as a \*physiological illusion.

### References

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- Verstraten, F.A.J. (1996). On the ancient history of the direction of the motion aftereffect. *Perception*, 25, 1177–1187.

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## Motor Hallucination

The term motor hallucination is indebted to the Latin noun *motio*, which means movement. It is used as a generic term for a group of motor phenomena exemplified by onomatomania (i.e. compulsive speaking) and the \*psychomotor verbal hallucination (i.e. \*subvocalization). Although hallucinations are traditionally conceptualized as perceptual phenomena, the German neurologist and psychiatrist Kurt Goldstein (1878–1965) argues that motor phenomena such as compulsive speaking may well be mediated by a similar pathophysiological mechanism, affecting motor

rather than sensory cortical areas. As he maintains, "Under the influence of abnormal processes within the 'organ of thought' abnormal speech utterances can be elicited, especially when the excitability of the motorial foci is heightened; for example in certain forms of catatonic speech compulsion or flight of ideas." As Goldstein concludes, "Obsessive speaking thus becomes a process analogous to hallucinations in the motor sphere, a motor hallucination [*motorischen Hallucination*]." From a slightly different vantage point, the term motor hallucination is sometimes used as a synonym for the term \*kinaesthetic hallucination.

### Reference

- Goldstein, K. (1908). Zur Theorie der Hallucinationen. Studien über normale und pathologische Wahrnehmung. *Archiv für Psychiatrie und Nervenkrankheiten*, 44, 1036–1106.

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## Motor Illusion

Also known as motor sensation and \*illusory movement. The term motor illusion is indebted to the Latin noun *motio*, which means movement. It is used to denote a \*kinaesthetic hallucination characterized by the illusory sensation of movement of one or more body parts. Pathophysiologically, motor illusions are associated primarily with lesions of parts of the parietal lobe involved with bodily representation and/or the representation of movement. Etiologically, they are associated primarily with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy. Motor illusions may also occur in individuals with a clinical diagnosis of \*schizophrenia or in the context of hemiplegia due to parietal lobe lesions. As the British neurologist Macdonald Critchley (1900–1997) maintains, "The patient may entertain that one of his limbs is completely detached from his own body and occupies some position nearby or afar. Or the patient may imagine his affected limb to be moving when it is actually immobile. Such an idea may be illusory or delusional; it can occur in episodic fashion, or it can be continual." As demonstrated in myriad experimental configurations, motor illusions can be evoked within seconds when muscle vibration is used to generate proprioceptive misinformation about limb position. Some examples of the

resulting motor illusions are the \*illusory arm extension and the \*Pinocchio illusion. Vibration-induced illusory movement experiences were first described in 1972 in two separate and independent publications.

### References

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- Jones, L.A. (1988). Motor illusions: What do they reveal about proprioception? *Psychological Bulletin*, 103, 72–86.

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## Motor Sensation

see Motor illusion.

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## Motor Tinnitus

The term motor tinnitus comes from the Latin words *motio* (movement), and *tinnire* (to ring). It is used to denote a type of \*sensorineural tinnitus attributable to damage to the ear's outer hair cells. The term motor tinnitus is used in opposition to \*transduction tinnitus, \*transformation tinnitus, and \*objective tinnitus.

### Reference

- Henry, J.A., Dennis, K.C., Schechter, M.A. (2005). General review of tinnitus. Prevalence, mechanisms, effects, and management. *Journal of Speech, Language, and Hearing Research*, 48, 1204–1235.

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## Motor Verbal Hallucination

see Subvocalization.

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## Mouches Volantes

see Muscae volitantes.

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## Mountain Spectre

see Brocken spectre.

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## Movement Phonism

A term used to denote a type of \*synaesthesia characterized by a hallucinated sound (i.e. a \*phonism) that is triggered by a regular kinaesthetic feeling (movement).

### Reference

- Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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## Movement Phosphene

A term introduced in or shortly before 1976 by the American neurologists Floyd A. Davis et al. to denote a type of \*phosphene (i.e. a transient flash or spark of light) that may be evoked by eye movement. Etiologically, movement phosphenes are associated primarily with optic neuritis and multiple sclerosis. They should not be confused with \*flick phosphenes, which occur physiologically. As noted by Davis et al., the movement phosphene is conceptualized as a clinical sign analogous to the Lhermitte sign in cervical cord lesions. The term movement phosphene is used in opposition to the terms \*convergence phosphene, flick phosphene, and \*sound phosphene.

### Reference

- Davis, F.A., Bergen, D., Schauf, C., McDonald, I., Deutsch, W. (1976). Movement phosphenes in optic neuritis. A new clinical sign. *Neurology*, 26, 1100.

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## Movement Photism

A term used to denote a type of \*synaesthesia characterized by a hallucinated light or colour sensation (i.e. a \*photism) triggered by a regular kinaesthetic sensation (movement).

### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition.* Cambridge, MA: MIT Press.

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## Movie Format of Visual Hallucinations

see Slide show format of visual hallucinations.

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## Moving Hallucination

The term moving hallucination refers to a \*visual hallucination consisting of one or more moving objects or patterns. It is used in opposition to the term \*static hallucination.

### Reference

Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception.* London: Walter Scott.

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## Moving Scotoma

A term used to denote a \*scotoma (i.e. an area of loss or impairment of vision) that moves across the field of vision. A well-known example is the \*fortificating spectrum or \*scintillating scotoma preceding a migraine attack. The term moving scotoma is used in opposition to the term \*stationary scotoma.

### Reference

Sacks, O. (1992). *Migraine. Revised and expanded.* New York, NY: Vintage Books.

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## Mozart, Chrysostomus Wolfgangus Theophilus (1756–1791)

Better known as Wolfgang Amadeus Mozart. A famous Austrian composer, pianist, and conductor, who may have experienced a \*compound hallucination. In 1791, Mozart was visited by an unknown person who requested him to write a requiem. This person, who remained unknown to Mozart, was later tentatively identified by historians as Franz Anton Leutgeb (or Leutgeb), a man who supposedly acted on behalf of Count Franz von Walsegg-Stuppach (1763–1827), who was in the habit of publishing commissioned musical pieces under his own name. However, others have suggested that the unknown visitor was none other than a \*personification, i.e. a compound hallucination depicting a human being. As the British surgeon Walter Cooper Dendy (1794–1871) wrote in 1847, “The Requiem of Mozart. . . was written by desire of a solemn personage, who repeatedly, [Mozart] affirmed, called on him during its composition, and disappeared upon completion. The requiem was soon chanted over *his own* grave; and the man in black was, I believe, but a phantom of his own creations.”

### Reference

Dendy, W.C. (1847). *The philosophy of mystery.* New York, NY: Harper & Brothers.

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## Müller, Johannes Peter (1801–1858)

A German physiologist and zoologist who is probably best known in psychiatry for his work *On the Fantastic Phenomena of Vision*, in which he laid down important new principles for the description, understanding, and explanation of hallucinations. As noted by the British historian of psychiatry German E. Berrios, Müller experienced \*visual hallucinations from childhood onwards. Reportedly, these consisted of human or humanoid figures moving against the white wall opposite his parents' house. Shortly after he got married, Müller suffered a 'nervous breakdown', about which little else is known, and later a second one.



**Fig. 6** Johannes Müller

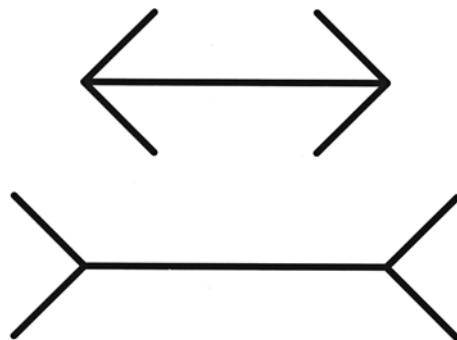
### References

- Berrios, G.E. (2005). On the fantastic apparitions of vision by Johannes Müller. *History of Psychiatry*, 16, 229–246.
- Müller, J. (1826). *Ueber die phantastischen Gesichterscheinungen*. Koblenz: Hölscher.

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### Müller-Lyer Illusion

Also known as arrowhead illusion. The eponym Müller-Lyer illusion refers to the German sociologist Franz Carl Müller-Lyer (1857–1916), who described the concomitant phenomenon in or shortly before 1889. This phenomenon consists of a \*geometric-optical illusion characterized by a perceived difference in length between two mathematically identical lines, one of which is bounded by a pair of arrowheads pointing towards each other and the other by a pair pointing away from each other. The line with the arrowheads pointing away from each other is consistently perceived as being shorter in length than the one with the arrowheads pointing towards each other.



**Fig. 7** Müller-Lyer illusion. Source: Müller-Lyer, F.C. (1889). *Optische Urteilstäuschungen*. *Dubois-Reymonds Archiv für Anatomie und Physiologie*, Supplement Volume, 263–270

The Müller-Lyer illusion is considered a physiological phenomenon that arises as a consequence of the inherent properties of the visual system. As a consequence, it tends to be classified as a \*physiological illusion. Following the publication of Müller-Lyer's original paper, many similar illusions have been described in relation to alternative configurations of lines.

### References

- Bermond, B., van Heerden, J. (1996). The Müller-Lyer illusion explained and its theoretical importance reconsidered. *Biology and Philosophy*, 11, 321–338.
- Müller-Lyer, F.C. (1889). *Optische Urteilstäuschungen*. *Dubois-Reymonds Archiv für Anatomie und Physiologie*, Supplement Volume, 263–270.
- Rutten, F.J.Th. (1929). *Psychologie der waarneming. Een studie over gezichtsbedrog*. Thesis, University of Utrecht.

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### Multimodal Hallucination

see Compound hallucination.

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## Multiplication

The term multiplication comes from the Latin verb *multiplicare*, which means to multiply or to duplicate. It is used to denote the presence of multiple identical images in \*visual hallucinations. Multiplication is a characteristic feature of a number of hallucinatory phenomena, including \*diplopia, \*entomopia, \*monocular diplopia, \*polyopia, and \*polyopic heautoscopy.

### Reference

ffytche, D.H., Howard, R.J. (1999). The perceptual consequences of visual loss: 'Positive' pathologies of vision. *Brain*, 122, 1247–1260.

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## Munch, Edvard (1863–1944)

A Norwegian expressionist painter who from the age of 60 onwards suffered from \*scotomata and \*metamorphopsias due to an intraocular haemorrhage. Reportedly, Munch made drawings of the effects of this intraocular condition and documented them with the aid of a grid of lines. It has been suggested that Munch's later style was inspired by these \*sensory distortions.

### Reference

Marmor, M.F. (2000). A brief history of macular grids: From Thomas Reid to Edvard Munch and Marc Amsler. *Survey of Ophthalmology*, 44, 343–353.

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## Muscae Volitantes

Also known as *mouches volantes*, floaters, eye floaters, vitreous floaters, flying gnats, and entopsia. *Muscae volitantes* is Latin for flying flies. The term is used to denote an \*entoptic phenomenon consisting of out-of-focus black or greyish specks, spots, threads, or fragments of cobwebs, which move slowly across the visual field. Normally muscae volitantes tend to go unnoticed because their angular size is small, and they affect each eye differently. They can be seen best against a uniformly bright background and sometimes even better through a pin-

hole placed close to the eye. Pathophysiologically, muscae volitantes are associated with the presence of deposits of protein or other cell debris of varying size, shape, consistency, refractive index, and motility within the eye's vitreous humour, the shadows of which are projected upon the retina. They may be congenital or acquired in nature. In the latter case, they may be due to vitreoretinal disorders, to trauma, or simply to ageing. The perception of muscae volitantes is referred to as mydeopsia, myiideopsia, myiodesopsia, or myodesopsia. Sometimes muscae volitantes lead the affected individual to perceive fleeting illusory images, called \*passage hallucinations. It has been speculated that these may even act as \**points de repère* for the development of \*complex visual hallucinations. As the British surgeon Walter Cooper Dendy (1794–1871) wrote in 1847, "*Muscae volitantes* are usually, though not always, *substantial*; i.e., depending on *points* or *fibres* in the axis of vision, on *congestions*, or *varicose* states of the vessels of the *choroid* or *retina*, or of atoms floating in the humours. These specks, which do not appear alike in the eyes of all, and the brilliant beams in the *suffusio scintillans*, so varied and so whimsical, might be readily moulded into human form by the imagination of an enthusiast or the feelings of the ghost-seer, who is usually morose and melancholy, in a state of *longing* for a ghost or a mystery." Muscae volitantes should not be confused with the \*blue-field entoptic phenomenon.

### References

Dendy, W.C. (1847). *The philosophy of mystery*. New York, NY: Harper & Brothers.  
 Murakami, K, Jalkh, A.E., Avila, M.P., Trempe, C.L., Schepens, C.L. (1983). Vitreous floaters. *Ophthalmology*, 90, 1271–1276.

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## Muscular Verbal Hallucination

see Subvocalization.

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## Mushrooms and Hallucinations

see Psilocybin and hallucinations.

## Musical Hallucination

Also known as musical hallucinosis, \*auditory Charles Bonnet syndrome, and Oliver Sacks' syndrome, after the British neurologist Oliver Wolf Sacks (b. 1933). All four terms are used to denote an \*auditory hallucination characterized by songs, tunes, melodies, harmonics, rhythms, and/or timbres. Phenomenologically, musical hallucinations resemble ordinary music. They are also likened to tunes that go round in the head, except for the fact that musical hallucinations have a definite perceptual quality, and that in most cases they cannot be stopped voluntarily (although some individuals report that they can alter the tempo or change the tune of their musical hallucinations at will). Sometimes a distinction is made between vocal and instrumental types of musical hallucinations. Whether the vocal type – consisting of songs, or singing, or humming voices – should be allowed to count as a \*verbal auditory hallucination (VAH) is a taxonomic issue open to debate. Musical hallucinations tend to commence abruptly, but they have also been reported as developing gradually out of \*tinnitus. In the latter case they are also referred to as \*musical tinnitus. They can be heard either continuously or discontinuously, inside or outside the head, and may be repetitive and stereotyped, or elaborate and constantly changing. Their content may be familiar or unfamiliar, but tunes remembered from childhood are often reported. Musical hallucinations can occur either in isolation, or in association with other types of auditory hallucinations (both verbal and nonverbal), or \*compound hallucinations. Although historically they have been regarded as rare, it is now believed that they have merely been underreported. The first known account of musical hallucinations was published in 1846 by the French alienist Jules Gabriel François Baillarger (1806–1891). In 2004 the German neurologists Stefan Evers and Tanja Ellger were able to retrieve 132 cases in the literature. When musical hallucinations are attributed to an identifiable somatic disorder, they are referred to as symptomatic musical hallucinations. When such an underlying somatic condition cannot be demonstrated, they are referred to as idiopathic musical hallucinations. Among individuals experiencing musical hallucinations there would seem to be a marked overrepresentation of females (pur-

portedly as high as 70 or 80%), and the elderly (mean age 62 years) with or without a clinical diagnosis of Alzheimer's disease. A history of psychiatric illness (notably mood disorder or \*psychotic disorder) was found in under a quarter of the published cases. On the other hand, neurological disorders (such as space-occupying lesions, epileptic foci, and cerebrovascular disease affecting the right or left temporal lobe) were found in some 40% of cases. Musical hallucinations were described primarily in association with audiological complaints such as \*hypacusia and \*deafness. Other associated conditions are tinnitus, inflammatory encephalopathy, encephalitis, \*Lyme disease, the use of therapeutics (such as \*antibiotics, antidepressants, opioids, salicylates, and beta blockers), and the use of alcohol, cocaine, \*hallucinogens, and other illicit substances. A case report by the French psychiatrists Jean Lhermitte (1877–1959) and Georges Parcheminey (1888–1953) indicates that musical hallucinations may also occur as a complication of electroconvulsive treatment (ECT). The neurophysiological correlates of musical hallucinations are still obscure. The neurobiology of music suggests that the hemisphere non-dominant for language plays a key role in the processing of music, and thus perhaps also in the mediation of musical hallucinations. However, empirical evidence indicates that there is only a slight preference for the right temporal lobe. As for the pathophysiological mechanisms underlying musical hallucinations, it has been suggested that \*deafferentiation plays a role in their mediation (hence the eponym auditory Charles Bonnet syndrome). A second hypothesis takes into account the possible role of auditory \*sensory deprivation, followed by \*perceptual release. This proposed mechanism is also referred to as the \*parasitic memory hypothesis. A third hypothesis focuses on focal epileptic seizures and focal brain lesions directly affecting a network module involved in the processing of music. It has been suggested that musical hallucinations may also play a role in musical creativity. This may have held true in the case of composers such as Joseph Haydn (1732–1809), Gaetano Donizetti (1797–1848), Maurice Ravel (1875–1937), and Bedřich Smetana (1824–1884).

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## Musical Hallucinosi

see Musical hallucination.

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## Musical Illusion

Also referred to as audio illusion. Both terms are used to denote a paradoxical \*auditory illusion created with the aid of musical sounds. The British-American cognitive psychologist Diana Deutsch designed and published many musical illusions. An example is the octave illusion, also referred to as Deutsch's illusion. This illusion can be evoked by repeatedly presenting a dichotic pair of tones, spaced an octave apart, to the left and right ear in alternation, so that when the relatively high tone is perceived by the right ear, the relatively low one is perceived by the left ear, and vice versa. This procedure typically results in the illusion of a single low tone perceived by one ear, alternating with a single high tone perceived by the other ear. Other examples of musical illusions developed by Deutsch are the scale illusion, chromatic illusion, glissando illusion, cambiata illusion, and tritone paradox.

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## Musical Tinnitus

A term used to denote a type of \*tinnitus (i.e. 'ringing in the ears') characterized by songs, tunes, melodies, harmonics, rhythms, and/or timbres. Phenomenologically, musical tinnitus is indistinguishable from the \*musical hallucination. However, it tends to co-occur with – or develop out of – other types of tinnitus. It is not unthinkable that the pathophysiological substratum of musical tinnitus and musical hallucinations is similar or even identical.

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## Music-Colour Synaesthesia

see Coloured music.

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## Myers's Definition of Hallucinations

In his posthumously published work of 1903, the British classical scholar, writer, poet, and paranormal researcher Frederic Myers (1843–1901) defined hallucinations as follows: "A hallucination, one may say boldly, is in fact a *hyperaesthesia*; and generally a *central hyperaesthesia*. That is to say, the hallucination is in some cases due indirectly to peripheral stimulation; but often also it is the result of a stimulus to 'mind's-eye vision,' which sweeps the idea onwards into visual form, regardless of ordinary checks."

## Reference

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**Myiodeopsia**

see *Muscae volitantes*.

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**Myiodesopsia**

see *Muscae volitantes*.

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**Myodeopsia**

see *Muscae volitantes*.

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**Myodesopsia**

see *Muscae volitantes*.

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**Mysticism and Hallucinations**

The term mysticism comes from the Greek noun *mustèrion*, which means secret. It refers to a wide range of practices directed at grasping or attaining the ultimate reality of things, and/or at experiencing a direct form of communication or unity with 'the highest'. Mysticism is based on the premise that it is possible to establish a direct relationship with God or the Deity through introspection, meditation, and self-purification rather than through prayer. It is not associated exclusively with any particular religion. The term apophatic mysticism refers

to a strand of mysticism characterized by the emptying of the subject's awareness of all stimuli. The term kataphatic (or imagistic) mysticism refers to the opposite approach, i.e., the filling of the subject's awareness with imagistic percepts. These imagistic percepts can occur in any of the sensory modalities. Throughout human history, kataphatic mystics have been aided by \*entheogens to attain their desired spiritual experiences. The ensuing mental state is often referred to as \*ecstasy. The group headed by the American-Canadian neuropsychologist Michael A. Persinger (b. 1945) claims that mystical experiences, including \*sensed presence and hallucinatory experiences, can also be evoked experimentally with the aid of a \*Koren helmet. On the basis of experiments such as these it has been suggested that religious and mystic experiences have an exclusively neural basis, associated with aberrant neurophysiological activity in the temporo-parietal lobes.

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**Mysticomimetic**

see Hallucinogen.

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## Nabokov, Vladimir Vladimirovich (1899–1977)

A Russian-American novelist and short story writer who experienced \*synaesthesias of the grapheme-colour type, meaning that he perceived coloured textures and shapes in association with letters of the alphabet. Nabokov referred to his own condition as colour hearing, although he was well aware that sounds were not involved in the experience. As he wrote in his autobiography, “Perhaps ‘hearing’ is not quite accurate, since the color sensation seems to be produced by the very act of my orally forming a given letter while I imagine its outline. The long a of the English alphabet (and it is this alphabet I have in mind farther on unless otherwise stated) has for me the tint of weathered wood, but a French a evokes polished ebony. This black group also includes hard g (vulcanized rubber) and r (a sooty rag bag being ripped). Oatmeal n, noodle-limp l, and the ivory-backed hand mirror of o take care of the whites. I am puzzled by my French on which I see as the brimming tension-surface of alcohol in a small glass. Passing on to the blue group, there is steely x, thundercloud z, and huckleberry k. Since a subtle interaction exists between sound and shape, I see q as browner than k, while s is not the light blue of c, but a curious mixture of azure and mother-of-pearl. Adjacent tints do not

merge, and diphthongs do not have special colors of their own, unless represented by a single character in some other language (thus the fluffy-gray, three-stemmed Russian letter that stands for sh [Ш], a letter as old as the rushes of the Nile, influences its English representation).”

### Reference

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## Napoleon Bonaparte (1769–1821)

The famous French First Consul, and later Emperor of France, who may have experienced a \*visual hallucination consisting of a shining star. As recounted by the French alienist Alexandre Jacques François Briere de Boismont (1797–1881), Napoleon at one point cried out to one of his division generals, Count Jean Rapp (1771–1821), who failed to see the star pointed out to him, “What!...you do not see it? It is my star, it is before you, brilliant. . . it has never abandoned me, I see it on all great occasions, it commands me to go forward, and it is a constant sign of good fortune to me.” Whether this anecdote may serve as testimony of a certain proneness to hallucinations on Napoleon’s part is naturally open to debate.

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## Narcolepsy and Hallucinations

Narcolepsy is also known as narcoleptic syndrome, hypnolepsy, hypnopathy, Gélinau's syndrome, Gélinau's disease, paroxysmal sleep, and sleep epilepsy. The term narcolepsy comes from the Greek words *narke* (numbness) and *lèpsis* (attack, seizure). It translates loosely as 'somnolence seizure'. The eponyms Gélinau's syndrome and Gélinau's disease refer to the French neurologist Jean-Baptiste Edouard Gélinau (1828–1906), who introduced the term *narcolepsie* in or shortly before 1880 to denote a neurological condition characterized by the compulsion to sleep for short durations at close intervals, and spells of cataplexy. Descriptions of narcolepsy *avant la lettre* can be found in the literature dating back to ancient times. The first modern case reports of narcolepsy–cataplexy are commonly attributed to the German neurologist and psychiatrist Carl Friedrich Otto Westphal (1833–1890), although prior accounts were published by an author named Caffè in 1862, and by the German ophthalmologist Heinrich Bruno Schindler in 1829. Today the term narcolepsy is used to denote a neurological disease characterized by a variety of symptoms, including cataplexy, memory disturbances, \*diplopia, strabismus, excessive daytime sleepiness, recurring \*microsleep lapses, \*sleep paralysis, and sleep-related hallucinations such as \*hypnagogic and \*hypnopompic hallucinations. The sleep attacks in narcolepsy typically have a sudden onset. They may occur at any moment of the day, even during one's engagement in potentially dangerous activities such as driving a motor vehicle. Electrophysiologically, these attacks are characterized by an immediate entry into the stage of REM sleep. Additional symptoms in narcolepsy include fragmented night sleep (i.e. insomnia), amnesic motor \*automatisms, and \*hallucinations proper, which are often of a \*visual nature. These visual hallucinations tend to be \*complex in nature, although \*compound hallucinations have also been reported, depicting scenes which are hardly

distinguishable from sense perceptions. The lifetime prevalence of narcolepsy is estimated to be around 1 per 2,000 persons. Pathophysiologically, narcolepsy is associated with an autoimmune process affecting the hypothalamus, which entails a reduction in the synthesis of hypocretin or orexin, a protein which plays a crucial role in the regulation of the sleep–wake cycle. Etiologically, this autoimmune process is associated with variations in the human leukocyte antigen (HLA) system, due to a chromosomal disorder affecting chromosome 6p21.3. Narcolepsy is usually classified as one of the dyssomnias. It tends to be treated with CNS stimulants such as methylphenidate or other amphetamines.

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## Narcotic Hallucinosis

The term narcotic hallucinosis is indebted to the Greek noun *narkōsis*, which means petrification or anaesthesia. It translates loosely as 'a hallucinatory state due to the use of narcotics'. The term narcotic was formerly used to denote any substance capable of inducing a state of stupor or insensibility. In biomedicine, it is now considered obsolete. However, the term narcotic hallucinosis is still in use to denote a hallucinatory state mediated by the use of morphine and other opioids (i.e. \*opioid-induced hallucinations). The hallucinations occurring in the context of narcotic hallucinosis tend to be \*auditory or \*visual in nature. As a nosological category, narcotic hallucinosis can be classified as a specific type of \*hallucinosis syndrome. For more detailed information, see the entry Opioid-induced hallucination.

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**Near-Death Experience (NDE)**

A term coined in or shortly before 1975 by the American parapsychologist Raymond A. Moody, Jr. (b. 1944) to denote a collection of \*sensory deceptions reported by individuals who were close to death or were declared clinically dead and then later resuscitated. Based on a study of 150 individuals, Moody discriminates nine broad categories of sensory deceptions characteristic of NDE, comprising (1) sounds such as buzzing, (2) feelings of peace and painlessness, (3) \*out-of-body experiences (OBEs), (4) the feeling of travelling through a \*tunnel, (5) the feeling of rising into the heavens, (6) seeing deceased relatives or other people (i.e. \*take-away apparitions or \*personifications), (7) seeing spiritual beings, (8) seeing a review of one's earthly life, and (9) feeling a reluctance to return to one's earthly life.

**Reference**

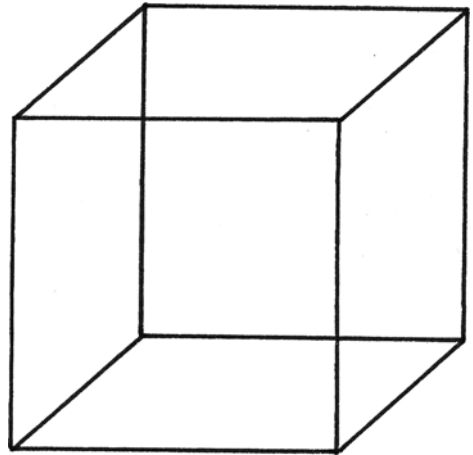
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**Nebenbildwahrnehmung**

see Pareidolia.

**Necker Cube**

The eponym Necker cube refers to the Swiss naturalist and crystallographer Louis Albert Necker (1730–1804), who in 1832 published an account of a line drawing of a cube with no depth cues that may function as an \*ambiguous illusion because of its fluctuating three dimensionality during prolonged viewing. Necker discovered the phenomenon in his drawings of rhomboid crystals, which seemed to switch depth. The Necker cube is usually classified as a \*cognitive illusion.



**Fig. 1** Necker cube. Illustration by JDB

**References**

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 Necker, L.A. (1832). Observations on some remarkable phenomena seen in Switzerland; and an optical phenomenon which occurs on viewing of a crystal or geometrical solid. *Philosophical Magazine*, 1, 329–337.

**Negative Afterimage**

Also known as \*Purkinje afterimage. The adjective negative refers to the fact that the colours of this type of \*afterimage are complementary to the colours of the primary stimulus. The term negative afterimage is used in opposition to \*positive afterimage, a term that is reserved for duplicate images that have the same relative brightness relations as the perceived object or stimulus. The negative afterimage is usually classified as a \*physiological illusion.

**Reference**

Brown, J.L. (1965). *Afterimages*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: Wiley.

## Negative Autoscopy

Also known as negative heautoscopy and asomatoscopy. The term negative autoscopy is used to denote a variant of \*autoscopy (i.e. the perception of a hallucinated image of oneself) characterized by the transient failure to perceive one's own mirror image while looking into a reflecting surface such as a mirror. Reports of negative autoscopy are extremely rare. In his classic work on autoscopy, the French physician and psychologist Paul Auguste Sollier (1861–1933) mentions three cases of negative autoscopy. In two of these cases, the affected individual is described as being unable to perceive his own reflection in the mirror. In one of these cases, the reflection reportedly returned after half an

hour. In the third case, the inability to perceive a mirror image was attributable to the interference by lively \*visual hallucinations depicting various scenes and unknown faces (i.e. \*facial hallucinations). Sollier suspected that two of the three cases may have been due to hysteria. He employed the term negative autoscopy in opposition to the term \*positive autoscopy, or what is today known simply as autoscopy. Conceptually, negative autoscopy is related to \*mirrored self-misidentification. In a conceptual and phenomenological sense, it has also been linked to prosopagnosia (i.e. 'face blindness'), especially in those cases where a reflection in the mirror is misidentified as someone else's. This 'incomplete' type of negative autoscopy has been designated by the French psychiatrists Henri Hécaen (1912–1983) and Julian



**Fig. 2** Negative autoscopy. Illustration by JDB

de Ajuriaguerra (1911–1993) as a variant of \*autotopagnosia. Negative autoscopia may be classified as a \*cognitive illusion. It has also been classified as a \*negative hallucination which is restricted to one's own body. In the latter reading, the notion of negative autoscopia includes the inability to perceive one's body directly, either in part (i.e. seeing only one side of the body) or in whole. Negative autoscopia may be accompanied by \*aschematia or \*acenesesthesia.

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## Negative Hallucination

Also known as \*scotomization. Both terms are used to denote the failure to perceive an object or stimulus that is present in the extracorporeal world and lies within the subject's range of perception. The term negative hallucination is used in opposition to the term \*positive hallucination, which denotes the perception of an object or stimulus that lacks an appropriate source in the extracorporeal world. The term negative hallucination was coined in or shortly before 1884 by the French internist Hippolyte Bernheim (1840–1919). Since then, it has been given various meanings and connotations. In Bernheim's case, the notion of negative hallucination was linked to hypnotism, a technique by means of which the subject can be made to believe that a certain object or stimulus within his or her range of perception is missing. The historical literature abounds with examples of individuals reacting to suggestions such as these with the inability to perceive a chair, a table, an orange, the hypnotist himself, or the hypnotist's head, even when these remain right in front of them. This phe-

nomenon is also referred to as \*hypnotic blindness. It tends to be attributed to a combination of *rapport* and distraction of the subject's attention. However, according to the German hallucinations researcher Edmund Parish (1861–1916), negative hallucinations thus evoked should not be allowed to count as veritable negative hallucinations. Parish follows the German psychologist Wilhelm Wundt (1832–1920) in attributing such 'failures to perceive' to a state of lowered or narrowed consciousness, co-occurring with diminished attention (i.e. what is known today as \*inattentive blindness). What Parish calls a \*true negative hallucination is a sensory percept that can be made to disappear without diverting the subject's attention, but by suggesting, for example, that the glass upon which the subject concentrates will disappear after a clicking sound is heard. A third meaning of the term negative hallucination involves the failure to perceive an object or stimulus in the extracorporeal world because it is 'blocked' or 'covered' by a positive hallucination. A hallucinated house, for example, may obstruct a person's view of the actual landscape lying behind it. In the fourth place, the term negative hallucination is sometimes used as an equivalent of the term time-gap (i.e. a stretch of time of which one has no memory). Negative hallucinations of this type have been described in the literature on post-traumatic stress disorder. As noted by the Dutch psychologist Bernardine J. Ensink (b. 1951), "It is a matter of definition whether time-gaps are conceived as (negative) hallucinations. During time-gaps persons do not notice events present, whereas during hallucinations persons notice events not present." When negative visual hallucinations occur in the context of hysteria, they are historically referred to as \*hysterical blindness. The notion of a negative hallucination does not necessarily apply to the visual modality. \*Total anaesthesia, for example, can also be conceptualized as a negative hallucination. Negative hallucinations should not be confused with the \*Perky phenomenon, in which images are perceived, but dismissed as imaginary in nature.

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## Negative Heautoscopy

see Negative autoscopy.

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## Negative Hemianopia

see Hemianopia.

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## Negative Phantom

see Hemiasomatognosia.

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## Negative Scotoma

The term negative scotoma is indebted to the Greek noun *skotos* (darkness). It is used in a general sense to denote an area or island of loss or impairment of vision (i.e. a \*scotoma), surrounded by a field of normal or relatively well-preserved vision. In a more specific sense, it is used to denote a type of scotoma that goes unnoticed by the affected individual and is only detected during examination of the visual field. When used in the latter sense, the term negative scotoma is used in opposition to the term \*positive scotoma.

### Reference

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## Negative Visual Aura

see Migraine aura.

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## Nervenreiztraum

The German term *Nervenreiztraum* translates loosely as 'nerve-impulse dream'. It was coined in or shortly before 1882 by the German philosopher Heinrich Spitta (1849–1929) to denote a \*dream, the content of which is attributable to external perceptual stimuli such as the sound of a door slamming, the sound of rainfall, or the feeling of a cat jumping onto the bed. Because of the indebtedness of the *Nervenreiztraum* to such external stimuli, Spitta places this sleep-related phenomenon conceptually on a par with \*illusions.

### Reference

Spitta, H (1882). *Die Schlaf- und Traum-zustände der menschlichen Seele*. Freiburg i.B: Mohr.

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## Neural Injury Pain

see Deafferentiation pain.

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## Neuroleptics and Hallucinations

see Antipsychotics and hallucinations.

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## Neurolues and Hallucinations

see Syphilitic hallucinosis.

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## Neurosyphilis and Hallucinations

see Syphilitic hallucinosis.

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## Nicolai, Christoph Friedrich (1733–1811)

A German scholar, author, and bookseller who published an influential account of his own hallucinatory experiences in 1803. As Nicolai relates, in February 1791, after having experienced a series of life-events, he had a \*visual hallucination of a deceased person lying on the floor, which lasted for about 8 min. It reappeared

the same day, this time in an upright position, appearing and disappearing at irregular intervals, and was soon accompanied by several walking figures which had no apparent relation to the initial figure. In the days that followed, Nicolai began to see and hear a multitude of hallucinated individuals (i.e. \*personifications), some of which represented acquaintances, but the majority of which were unknown to him. As he observed, the presence and physical characteristics of these personifications were not under his voluntary control. Although they were highly realistic in appearance, he found that he was quite able to distinguish between them and actual persons in his environment. The phantasms were perceived by him day and night, usually inside his home, and less frequently in other people's houses or in the street. Sometimes they disappeared when he closed his eyes, but this was not always the case. In addition to human forms, Nicolai also perceived hallucinated animals, such as birds and dogs (i.e. \*zoopsia), and people riding on horseback. The visual and \*compound hallucinations endured for 2 months, after which he underwent blood-letting with the aid of leeches, a treatment prescribed to him before for different reasons. As recounted by Nicolai, "At last it was agreed that leeches should be again applied to me, as formerly; which was actually done, April 20<sup>th</sup> 1791, at eleven o'clock in the morning. No person was with me besides the surgeon; but during the operation my chamber was crowded with human phantasms of all descriptions. This continued uninterruptedly till about half an hour after four o'clock, just when my digestion commenced. I then perceived that they began to move more slowly. Soon after, their colour began to fade, and at seven o'clock they were entirely white. But they moved very little, though the forms were as distinct as before: growing however by degrees more obscure; yet not fewer in number as had generally been the case. The phantoms did not withdraw, nor did they vanish; which previous to that time had frequently happened. They now seemed to dissolve in the air; while fragments of some of them continued visible a considerable time. About eight o'clock the room was entirely cleared of my fantastic visions." According to Nicolai, after that day he never again experienced hallucinations. Although the cause of this hallucinatory episode was never elucidated, phenomenologically it would seem to fit in with the characteristics of \*Charles Bonnet syndrome, more specifically, the type of Charles Bonnet

syndrome in which visual hallucinations are experienced in the presence of preserved insight. The import of Nicolai's work for hallucinations research lies in the combination of his first-hand acquaintance with hallucinatory phenomena and his exceptional talent for verbalizing and analyzing them. This combination places him in a league with other hallucinating intellectuals, such as Daniel Paul Schreber (1842–1911), Victor Kandinsky (1849–1889), John Thomas Perceval (1803–1876), Vaslav Nijinsky (1889–1950), Guy de Maupassant (1850–1893), Fjodor Dostoevsky (1821–1881), and Ludwig Staudenmaier (1865–1933).

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## Nicotine Intoxication and Hallucinations

The term nicotine comes from the modern Latin name *herba nicotiana* (herb of the tobacco plant), which in turn derives from Jean Nicot (1530–1600), the name of a French diplomat stationed in Portugal who advocated the use of tobacco for therapeutic purposes shortly after its introduction in the Western world. The substance nicotine, or C<sub>10</sub>H<sub>14</sub>N<sub>2</sub>, is an alkaloid of the pyridine group obtained from the dried leaves of tobacco plants such as *Nicotiana tabacum* and *N. rustica*. Nicotine acts as an agonist of the nicotinic receptors in the peripheral and central nervous system. It is capable of facilitating the release of neurotransmitters such as serotonin, acetylcholine, and adrenaline. In its pure form, nicotine is one of the most lethal substances known to Man. The lethal dose in adults is considered to lie between 30 and 60 mg (or 0.5–1.0 mg/kg body weight). Death may occur within 5 min after ingestion of such dosages, usually due to paralysis of the respiratory muscles and/or a central respiratory depression. In the Western world, tobacco products are commonly ingested in relatively small amounts, either through inhalation or by chewing them. These amounts rarely result in hallucinatory effects. However, substantially larger



amounts, such as those taken by Eurasian and American shamans, may give rise to \*delirious states and extensive hallucinatory experiences. As the American anthropologist Johannes Wilbert asserts, "South American shamans ingest tobacco products via almost all humanly possible routes of administration: gastrointestinal, respiratory and percutaneous. They chew tobacco, drink tobacco juice and syrup, lick tobacco paste, apply tobacco enemas, snuff rapé and smoke. In addition, they administer tobacco products topically to the skin and to the eye. However, even more impressive than this diversity of administrative procedures, are the large amounts of tobacco ingested by the shaman in one sitting. For example, shamanic practitioners in the Guianas take cigars, tobacco juice, tobacco powder and cupfuls of tobacco pulp in the course of a single initiatory ritual." The initiatory states of \*ecstasy that a tobacco shaman must undergo as a novice, and later as a practitioner, have been characterized as "hallucinatory eschatological scenarios on a cosmic scale". However, many lacunae remain as to the exact effects of acute nicotine intoxication. A person intentionally employing nicotine for the purpose of exploring the psyche may be called a \*psychonaut.

#### Reference

Wilbert, J. (1991). Does pharmacology corroborate the nicotine therapy and practices of South American shamanism? *Journal of Ethnopharmacology*, 32, 179–186.

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### Nietzsche, Friedrich (1844–1900)

A German irrationalist philosopher who in 1889 experienced a manic–psychotic breakdown and spent the last 10 years of his life in a demented state. Although Nietzsche's initial psychiatric symptoms included mania, euphoria, delusions of grandeur, agitation, and lack of insight, references to any \*sensory deceptions are restricted to the \*fortification spectra experienced throughout his life in the context of migraine, and the \*ecstatic states, sometimes tentatively referred to as \*visions, experienced in 1888 and 1889 during his stay in Turin, Italy. Throughout his work one finds scattered references to 'a voice', but none of these can be regarded as proof of actual \*verbal auditory hallucinations. Whether Nietzsche experi-



**Fig. 3** Friedrich Nietzsche. Source: Ullstein Bild-dienst, Berlin

enced any hallucinations during the protracted final course of his illness, which was spent in a state of apathy and dementia, is purely speculative. The cause of Nietzsche's illness is still obscure. Various suggestions have been made, the most likely of which would seem to be general paralysis of the insane (GPI, i.e. neurolyues) and frontotemporal dementia (FTD).

#### References

- Jaspers, K. (1997). *Nietzsche. An introduction to the understanding of his philosophical activity*. Translated by Wallraff, C.F., Schmitz, F.J. Baltimore, MA: Johns Hopkins University Press.
- Orth, M., Trimble, M.R. (2006). Friedrich Nietzsche's mental illness – General paralysis of the insane vs. frontotemporal dementia. *Acta Psychiatrica Scandinavica*, 114, 439–444.
- Schain, R. (2001). *The legend of Nietzsche's syphilis*. London: Greenwood Press.

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### Night Blindness

see Nyctalopia.

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### Night Dream

see Dream.

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### Night-Hag

see Incubus.

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### Night-Mare

see Incubus.

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### Nightmare

Also known as \*ephialtes nocturnus, dream anxiety attack, REM anxiety dream, REM-nightmare, and D-nightmare. The term nightmare comes from the Old English noun \*mare, which means hag or goblin (see also the entries Mar, Mare, and Incubus). It is used to denote a terrifying or otherwise disturbing \*dream from which the dreamer awakens. The terms D-nightmare and REM-nightmare refer to the temporal coincidence of nightmares with D-sleep, which stands for desynchronized sleep or rapid eye movement (REM) sleep. The first Greek physician known to have dealt with the nightmare in his research was Themison of Laodicea (first century BC), a pupil of Asclepiades of Bythnia (124–c. 40 BC). In ancient Greece the nightmare used to be associated with \*Ephialtes, the daimon of nightmares, and allegedly a manifestation of Pan. The mythological creature the Romans associated with the nightmare was the \*incubus. In 1830 the Scottish physician Robert MacNish (1802–1837) qualified the nightmare as follows: “Nightmare may be defined [as] a painful dream, accompanied with difficult respiratory action, and a torpor in the powers of volition... The affection, the Ephialtes of the Greeks, and Incubus of the Romans, is one of the most distressing to which human nature is subject. Imagination cannot conceive the horrors it frequently gives rise to, or language describe them in adequate terms. They are a thousand times more frightful than the visions conjured up by necromancy or *diablere*; and far transcend every thing in history or romance, from

the fable of the writhing and asp-encircled Laocoon to Dante’s appalling picture of Ugolino and his famished offspring, or the hidden tortures of the Spanish inquisition. The whole mind, during the paroxysm, is wrought up to a pitch of unutterable despair: a spell is laid upon the faculties, which freezes them into inaction; and the wretched victim feels as if pent alive in his coffin, or overpowered by resistless and immitigable pressure.” Laboratory studies indicate that the majority of nightmares occur during stages of REM sleep. Dream-like phenomena resembling nightmares may also occur during stages of non-rapid eye movement (NREM) sleep, but these are believed to differ in a conceptual sense (and possibly in a phenomenological and physiological sense as well) from the nightmare proper. Thus the terms sleep-onset nightmare and \*hypnagogic nightmare are used to denote instances of dream-like \*hypnagogic hallucinations occurring during sleep onset, i.e. during stage N1 sleep as recorded on the electroencephalogram. The average 1-year prevalence of nightmares for adults is estimated as lying around 1 or 2. However, under the influence of somatic or psychiatric illness, their incidence may increase significantly. Some therapeutics known for their ability to increase the frequency of nightmares are the alkaloid reserpine, the dopamine precursor L-dopa, and beta blockers. Some therapeutics known for their ability to increase their frequency during withdrawal episodes are the benzodiazepines and the barbiturates. The same holds true for alcohol withdrawal. While stressful and traumatic events can also lead to an increase in the incidence of nightmares, a general sense of safety or protection is believed to reduce them. Because of their occurrence during sleep, nightmares – as well as other dreams – are by definition set apart from \*hallucinations proper and \*hypnagogia. Conceptually as well as phenomenologically, the nightmare is also distinguished from night terror (also known as stage 4 nightmare, pavor nocturnus, and incubus attack). The latter terms are used to denote a sudden moment of arousal and awakening from slow-wave sleep (also known as stage 4 sleep, stage N4 sleep, or deep sleep) characterized by marked anxiety, and autonomic symptoms such as profuse perspiration, mydriasis, tachycardia, and tachypnea. This moment of arousal and awakening is often accompanied by screaming and motor movements. Dream recall or recollection upon awakening is typically poor or absent. What distinguishes night terror from



**Fig. 4** The Nightmare. Oil painting (1781) by Henry Fuseli. Source: The Detroit Institute of Arts

the nightmare is that the nightmare is conceptualized as a dream, whereas night terror is conceptualized as an instant of arousal and awakening. When a nightmare takes on the quality of a long, frightening dream during which a traumatic event is re-experienced exactly or almost exactly, the terms \*traumatic nightmare and post-traumatic nightmare apply.

#### References

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#### Nightmare Fish

see Dream fish.

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#### Nightshade and Hallucinations

see *Atropa belladonna* and hallucinations.

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#### Nijinsky, Vaslav (1889–1950)

A Russian dancer, who at the height of his career was the most celebrated dancer in the Western world. In 1919, at the age of 29, Nijinsky gradually became psychotic. In his diary, which constitutes a unique day-to-day record of the emerging \*psychosis, Nijinsky describes \*verbal



**Fig. 5** Vaslav Nijinsky. Photograph (c. 1911–1912) by Elliot & Fry. Source: The Dance Collection, The New York Public Library for the Performing Arts, Astor, Lenox and Tilden Foundations

auditory hallucinations which he attributes to God, and which instruct him to carry out trivial as well as highly unusual assignments. Obeying these \*command hallucinations, Nijinsky eats meat against his will, decides to gamble all his savings on the stock market, wanders about through the snow in search of a murder victim, and lies down in the snow for hours for no other reason than that it appears to be the will of God. He developed many other psychotic symptoms and was diagnosed as suffering from \*schizophrenia by the Swiss psychiatrist Eugen Bleuler (1857–1939), who had coined the term in 1908. Bleuler, who had been informed of Nijinsky's condition by a former pupil of his and by Nijinsky's wife, was hesitant about making a psychiatric diagnosis. However, he reportedly needed no more than 10 min in Nijinsky's presence to diagnose the latter as "a confused schizophrenic with mild manic excitement." The import of Nijinsky's work for hallucinations research lies in the combination of his first-hand acquaintance

with hallucinatory phenomena, and his exceptional talent for verbalizing and analyzing them. This combination places him in a league with other hallucinating intellectuals, such as Victor Kandinsky (1849–1889), Daniel Paul Schreber (1842–1911), John Thomas Perceval (1803–1876), Christoph Friedrich Nicolai (1733–1811), Guy de Maupassant (1850–1893), Fjodor Dostoevsky (1821–1881), and Ludwig Staudenmaier (1865–1933).

#### References

- Acocella, J., ed. (2006). *The diary of Vaslav Nijinsky. Unexpurgated edition*. Translated by Fitzlyon, K. Chicago, IL: University of Illinois Press.
- Ostwald, P. (1991). *Vaslav Nijinsky: A leap into madness*. New York, NY: Carol Publishing.

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### Nitrous Oxide Hallucination

Nitrous oxide is also known as dinitrogen oxide ( $N_2O$ ) and laughing gas. All three names refer to a colourless, nonflammable gas that is widely used in biomedicine and dentistry for its anaesthetic effects. The term nitrous oxide hallucination is used to denote a hallucination experienced under the influence of nitrous oxide or nitrous oxide-oxygen. As these hallucinations have been described as being predominantly sexual in nature, and most prevalent in young women, it has been suggested that the notion of nitrous oxide hallucination is actually a smoke screen designed to protect health professionals guilty of sexual harassment. Critics of the hypothesis that nitrous oxide can evoke \*sexual hallucinations point out that the almost exclusive occurrence of such hallucinations in young females is inexplicable in scientific terms. Moreover, they point out that scientifically sound case reports are extremely rare, whereas numerous well-documented cases exist of dentists and other health professionals hiding behind the myth of the nitrous oxide hallucination, even after having been found guilty of sexual assault by a court of law. Proponents of the nitrous oxide hypothesis do not deny that nitrous oxide can be misused by health professionals for non-professional purposes, but they appeal to casuistic material concerning the occurrence of sexual aberrations reported by females under nitrous oxide sedation to substantiate their hypothesis. Understandably,

the stakes in this sensitive issue are high for health professionals working with nitrous oxide, as well as for the women under their care.

### References

- Bennett, C.R. (1980). Nitrous oxide "hallucinations". *Journal of the American Dental Association*, 101, 595–597.
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## N,N-Dimethyltryptamine and Hallucinations

see Dimethyltryptamine (DMT) and hallucinations.

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## Noctambulism

see Somnambulism and hallucinations.

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## Nocturnal Dream

see Dream.

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## Noise-Type Tinnitus

A term used to denote a type of \*tinnitus (i.e. 'ringing in the ears') characterized by a band of noise rather than a single tone. Noise-type tinnitus may present in the form of a hissing sound, for example. It is considered the most prevalent type of tinnitus. The term noise-type tinnitus is used in opposition to the term \*tonal tinnitus.

### Reference

- Vernon, J.A., Sanders, B.T. (2001). *Tinnitus. Questions and answers*. Boston, MA: Allyn and Bacon.

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## Non-affective Verbal Hallucination

A term featuring in the 1974 Present State Examination (PSE) schedule, developed by the British psychiatrists John Kenneth Wing et al. As defined in the PSE, the notion of non-affective verbal hallucination may refer to two distinct types of \*verbal auditory hallucination, one of which is characterized by one or more recognizable voices speaking *about* the subject and the other being characterized by one or more recognizable voices speaking *to* the subject. In both cases, the words or sentences uttered must be larger in number than two. Within the classification of the PSE schedule, the non-affective verbal hallucination is considered a variant of the \*verbal hallucination. The term is used in opposition to the term \*affective or non-specific verbal hallucination.

### Reference

- Wing, J.K., Cooper, J.E., Sartorius, N. (1974). *The measurement and classification of psychiatric symptoms. An instruction manual for the PSE and Catego Program*. Cambridge: Cambridge University Press.

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## Non-coincidental Hallucination

A term used to denote a hallucination, usually \*visual in nature, which the \*hallucinator believes to coincide with an actual event (typically the dying of another person) without this being the case. The term non-coincidental hallucination is used in opposition to the term \*coincidental hallucination. The German hallucinations researcher Edmund Parish (1861–1916) suggests that the majority of alleged coincidental hallucinations are really non-coincidental in nature. He explains the tendency to believe in such temporal coincidences in terms of a memory-delusion, i.e. a tendency to mould one's memory of prior hallucinations so as to connect them with a prominent event. This latter phenomenon is known as a \*hallucination of memory.

### Reference

- Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

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## Non-hallucinator

see Trait-negative hallucinator.

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## Non-ictal Hallucination

The term non-ictal hallucination is indebted to the Latin noun *ictus*, which means blow or thrust. In biomedicine, the term *ictus* is used to denote a paroxysmal epileptic seizure. The term non-ictal hallucination is used to denote a hallucination that is not attributed to a seizure disorder. The term is used in opposition to \*ictal hallucination.

### Reference

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## Non-idiopathic Synaesthesia

Also known as acquired synaesthesia. The term non-idiopathic synaesthesia is indebted to the negative adverb *non*, and the Greek words *idiopathia* (affliction of a local origin), *sun* (together, unified), and *aisthanesthai* (to notice, to perceive). It translates loosely as ‘not-inborn \*synaesthesia’, or ‘synaesthesia of a known origin’. An example of non-idiopathic synaesthesia is \*epileptic synaesthesia. The term non-idiopathic synaesthesia is used in opposition to \*idiopathic synaesthesia, which denotes a type of synaesthesia designated as inborn or developmental in origin.

### Reference

Harrison, J. (2001). *Synaesthesia. The strangest thing*. Oxford: Oxford University Press.

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## Non-morbid Hallucination

see Benign hallucination.

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## Non-sensory Hallucination

A term used by the British paranormal researcher Edmund Gurney (1847–1888) as an umbrella term for normal acts of the imagination or memory, such as remembered \*images, \*daydreams, and mental pictures, which all lack an actual perceptual quality, and have no objective basis in the extracorporeal world. Gurney uses the term non-sensory hallucination in opposition to the term \*sensory hallucination, which he reserves for a percept which lacks the objective basis which it suggests, whereby that lack can only be recognized by distinct reflection.

### Reference

Gurney, M. (1885). Hallucinations. *Mind*, 10, 161–199.

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## Non-specific Verbal Hallucination

see Affective or non-specific verbal hallucination.

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## Nonverbal Auditory Hallucination

Also known as \*akoasm, acoasm, acousma, \*nonverbal hallucination, and nonvocal auditory hallucination. All six terms are used to denote an \*auditory hallucination consisting of one or more sounds or noises, other than spoken words. The group of nonverbal auditory hallucinations includes hallucinated sounds such as machine noises, barking, whistling, \*musical hallucinations (mostly instrumental), and nonverbal sounds featuring prominently in \*tinnitus, such as ringing, hissing, a clear tone, a high-tension wire, buzzing, sizzling, whistling, humming, ticking, clicking, pounding, roaring, pulsation, the sound of the wind or waves upon the shore, an ocean roar, or the chirping of crickets. The term nonverbal auditory hallucination is used in opposition to the term \*verbal auditory hallucination.

### References

Asaad, G. (1990). *Hallucinations in clinical psychiatry. A guide for mental health professionals*. New York, NY: Brunner/Mazel.

Blom, J.D., Sommer, I.E.C. (2009). Auditory hallucinations. *Cognitive and Behavioral Neurology* (in press).

Wernicke, C. (1900). *Grundriss der Psychiatrie*. Leipzig: Verlag von Georg Thieme.

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## Nonverbal Hallucination

A term used in the 1974 Present State Examination (PSE) schedule, developed by the British psychiatrists John Kenneth Wing et al., to denote a hallucinated noise other than a recognizable word or sentence. Some examples of nonverbal hallucinations featuring in the PSE are music, tapping, central heating noises, whispering, muttering, and mumbling. According to Wing et al. the term nonverbal hallucination should not be applied in cases with an explicable origin in bodily processes, such as \*tinnitus. The term nonverbal hallucination is used in opposition to the term \*verbal hallucination.

### Reference

Wing, J.K., Cooper, J.E., Sartorius, N. (1974). *The measurement and classification of psychiatric symptoms. An instruction manual for the PSE and Catego program*. Cambridge: Cambridge University Press.

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## Nonvocal Auditory Hallucination

see Nonverbal auditory hallucination.

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## Normal Hallucination

see *Hallucination psychonome*.

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## Norman Arch

see Fortification spectrum.

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## Novaya Zemlya

see Superior mirage.

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## Number-Colour Synaesthesia

A term used to denote a type of \*synaesthesia in which visually or auditorily perceived numbers are followed by a hallucinated patch of colour.

### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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## Number Form

The term number form was introduced in or shortly before 1880 by the British scientist Sir Francis Galton (1822–1911) to denote a mental map or configuration of numbers which may appear automatically and involuntarily whenever one thinks of numbers. As observed by Galton, some individuals are capable of conjuring up numerals with a greater or lesser degree of vividness: “Persons who are imaginative almost invariably think of *numerals* in some form of visual imagery. If the idea of six occurs to them, the word ‘six’ does not sound in their mental ear, but the figure 6 in a written or printed form rises before their mental eye... There are a few persons in whom the visualising faculty is so low that they can mentally see neither numerals nor anything else; and... there are a few in whom it is so high as to give rise to hallucinations. Those who are able to visualise a numeral with a distinctness comparable to reality, and not in some sort of dreamland, will define the direction in which it seems to lie, and the distance at which it appears to be.” In some individuals, Galton found these numerals to be arranged in a peculiar configuration or ‘number form’. As he wrote, “The peculiarity in question... consists in the sudden and automatic appearance of a vivid and invariable ‘form’ in the mental field of view, whenever a numeral is thought of, in which each number has its own definite place. This Form may consist of a mere line of any shape, of a peculiarly arranged row or rows of figures, or of a shaded place... The Forms are sometimes variously coloured, occasionally very brilliantly. In all of these the definition and illumination vary much in different parts. Usually the Forms fade away into distinctness after 100; sometimes they come

to a dead stop.” Galton was under the impression that the capacity to conjure up number forms constitutes an inheritable trait, occurring in about 1 out of 30 adult males, and in 1 out of 15 females, most of whom developed this capacity during childhood. Today number forms are conceptualized as a special form of \*synaesthesia, called \*number-form synaesthesia. They are classified as a type of \*synaesthetic configuration and should not be confused with \*grapheme-colour synaesthesia. Pathophysiologically, the mediation of number forms is associated primarily with \*cross-activation between regions of the parietal lobe that are involved in numerical cognition and spatial cognition. For other pathophysiological hypotheses, see the entry Synaesthesia.

### References

- Galton, F. (1880). Visualised numerals. *Nature*, 21, 252–256.
- Galton, F. (1883). *Inquiries into human faculty and its development*. London: J.M. Dent & Sons.
- Ramachandran, V.S., Hubbard, E.M. (2001). Synaesthesia – A window into perception, thought and language. *Journal of Consciousness Studies*, 8, 3–34.

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## Number-Form Synaesthesia

A term used to denote a type of \*synaesthesia characterized by the automatic and involuntary appearance of a mental map or configuration of numbers whenever one thinks of numbers. These maps or configurations, referred to as \*number forms, can in some individuals gain the perceptual quality of full-blown hallucinations. The \*cross-activation hypothesis suggests that number-form synaesthesia is mediated by ‘crosstalk’ between regions of the parietal lobe that are involved in numerical cognition and spatial cognition.

### Reference

- Seron, X., Pesenti, M., Noël, M.-P. (1992). Images of numbers, or When 98 is upper left and 6 sky blue. *Cognition*, 44, 159–196.

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## Numen Praesens

see Numinous.

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## Numinous

Also known as *numen praesens*. Both terms were introduced in or shortly before 1917 by the German theologian Rudolf Otto (1869–1937) to denote the \*sensed presence of a sacred or daemonic entity.

### Reference

- Cheyne, J.A. (2001). The ominous numinous. Sensed presence and ‘other’ hallucinations. *Journal of Consciousness Studies*, 8, 133–150.

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## Nussbaumer, F.A.

A 19th-century Austrian philologist who has been credited with having been the first to render an autodescription of \*synaesthasias. Nussbaumer described a systematic association between colours and musical tones (i.e. \*colour hearing, or, more specifically, \*coloured music) that he and his brother had experienced since childhood. As he told the Viennese Association of Physicians in 1873, the two of them used to see colours in consonance with bars of music played on the reed organ in their parental home. The brothers had a habit of commenting enthusiastically on the colours rather than the music, employing quite baroque descriptions of the various hues they perceived, due to which they were often ridiculed by the other family members. It was not until they had reached adulthood that the Nussbaumer brothers realized how unique their experience was. In his paper on the subject, F.A. Nussbaumer reports that he experienced colour hearing in his \*dreams as well. Two other historical figures who claimed to be familiar with coloured music are the Russian composers Nikolai Rimsky-Korsakov (1844–1906) and Alexander Scriabin (1872–1915).

### References

- Nussbaumer, F.A. (1873). Ueber subjektive Farbenempfindungen, die durch objektive Gehörempfindungen erzeugt werden. Eine Mittheilung nach Beobachtungen an sich selbst. *Wiener Medizinische Wochenschrift*, 3, 52–54.
- Ziehen, Th. (1911). *Psychiatrie. Für Ärzte und Studierende bearbeitet. Vierte, vollständig umgearbeitete Auflage*. Leipzig: Verlag von S. Hirzel.



PLATE I.  
Examples of Number-Forms.

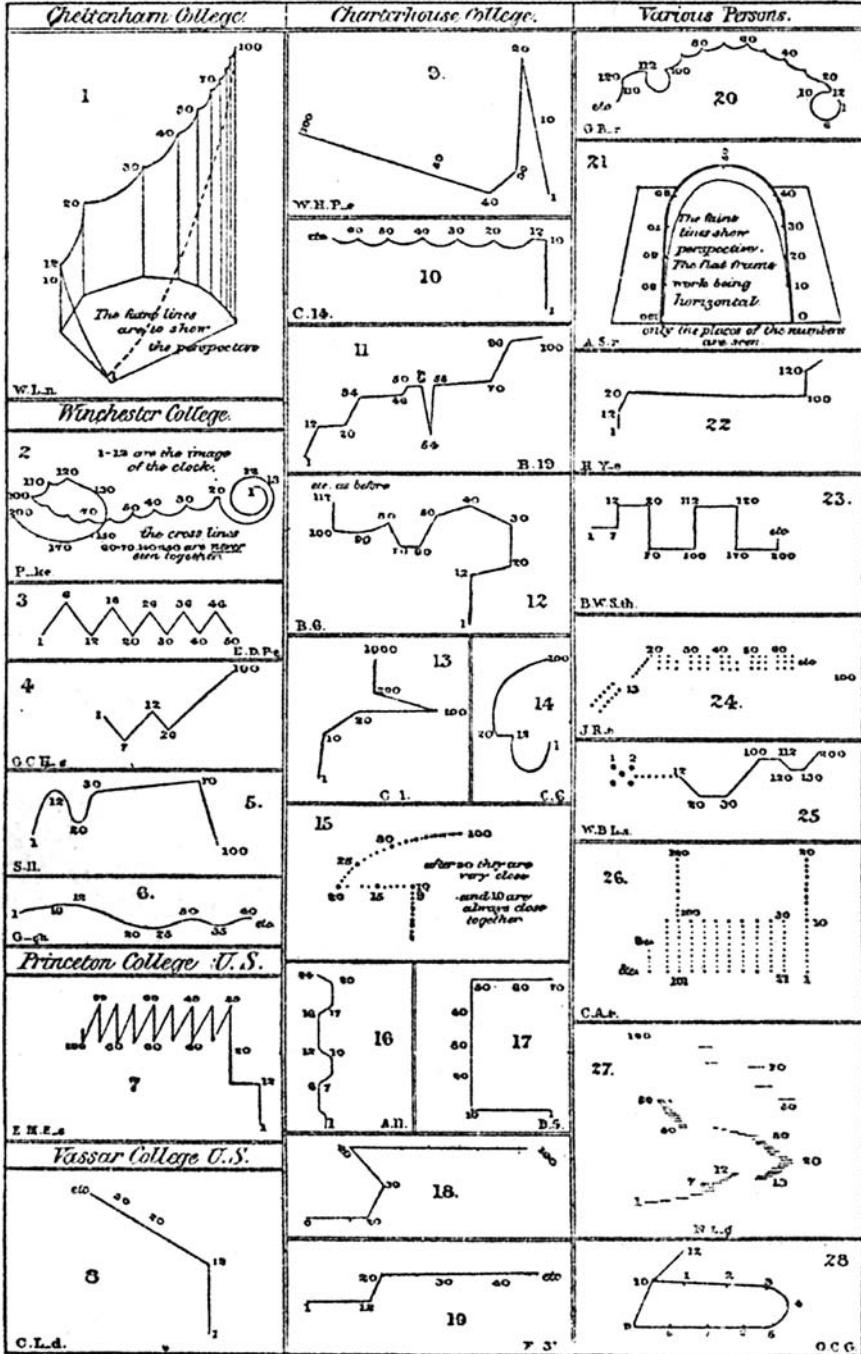


Fig. 6 Number forms. Source: Galton, F. (1883). *Inquiries into Human Faculty and its Development*. London: J.M. Dent & Sons

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## Nutmeg and Hallucinations

The name nutmeg refers to the dried kernels of the evergreen trees *Myristica acuminata* and *Myristica fragrans*, which are indigenous to the Moluccas and Indonesia. Nutmeg is a common household spice that was once used as an aphrodisiac, as an ingredient of a magical perfume, and as a therapeutic for various ailments, including problems of the digestive tract, asthma, and cardiac problems. It is now mainly used as a tasant in cooking and baking. In larger quantities, the oral ingestion of nutmeg may give rise to toxic effects such as sedation, nausea, vomiting, flushing, tachycardia, delusions, lively \*dreams, and hallucinations. Symptoms like these usually arise some 6 h after the ingestion of one or more kernels. Incidental cases of nutmeg abuse and subsequent intoxication have been described at least since the 12th century. The German Benedictine abbess and mystic Hildegard of Bingen (1098–1179) has been credited with providing one of the earliest descriptions of its psychoactive effects. Although nutmeg has been widely used as a substitute for \*marijuana by prisoners and other individuals unable to lay their hands on cannabis products, detailed descriptions of its hallucinogenic effects are rare. It has been reported to mediate \*visual, \*auditory, \*tactile, and \*kinaesthetic hallucinations (notably the sensation of floating), as well as \*body schema illusions. The major compounds held responsible for its hallucinatory effects are elemicine, myristicin, and safrole. It is believed that these substances are centrally transformed into amphetamine derivatives such as MDMA. A person intentionally employing nutmeg for the purpose of exploring the psyche may be called a \*psychonaut.

### References

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- Rätsch, Chr. (2005). *The encyclopedia of psychoactive plants. Ethnopharmacology and its applications*. Translated by Baker, J.R. Rochester, VT: Park Street Press.
- Rudgley, R. (1998). *The encyclopaedia of psychoactive substances*. London: Little, Brown and Company.

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## Nyctalopia

Also known as moonblink and night blindness. The term nyctalopia comes from the Greek words *nux* (night), *alaos* (blind), and *ōps* (eye). The first known reference is found in the book *Epidemics* of the Hippocratic Corpus. In the Hippocratic Corpus, as well as in the Anglo-Saxon literature, the term nyctalopia is characterized as an impairment of nocturnal vision due to defective dark adaptation, while the affected individual's vision in bright light remains unaffected. Nyctalopia is usually classified as an \*entoptic phenomenon. Pathophysiologically, it is associated primarily with a loss or impairment of rod photoreceptor function. Etiologically, it is associated primarily with a variety of acquired conditions such as vitamin A deficiency, retinitis pigmentosa, Usher's syndrome, and cancer-associated retinopathy. The condition may also be congenital, as in X-linked congenital stationary night blindness. Conceptually, nyctalopia constitutes the logical counterpart of \*hemeralopia (i.e. day blindness). In the continental European literature (notably the French, Italian, and Greek literature) the term nyctalopia is used to denote a relative *improvement* of vision at night. This paradoxical connotation was noted by the physician Galen of Pergamum, born as Claudius Galenus (129–c. 216), who wrote, "Nyctalopia is the condition when someone can see neither in the moon's light nor in the light of lanterns. . . but so also call a disease where the opposite is observed, namely to see better at night than the day. Some confirm that the word that describes night blindness is also used for these patients, so that eventually the word describes two kinds of diseases: the disease where we do not see at night and the one where we do not see during the day." It has been suggested that the connotation of day blindness was prompted by an alternative etymology in which the term nyctalopia translates as night vision (from the Greek words *nux* (night) and *ōps* (eye)). Apparently, in some European countries this version turned out to be the more influential one. Nevertheless, it would seem advisable to adhere to the original connotation of nyctalopia as a defective dark adaptation, or, alternatively, to use the term night blindness.

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- Ohba, N., Ohba, A. (2006). Nyctalopia and hemeralopia: The current usage trend in the literature. *British Journal of Ophthalmology*, 90, 1548–1549.

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## ‘Objective’ Polyopia

The term ‘objective’ polyopia was introduced in or shortly before 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to denote the perception of multiple identical images in regular visual perception (i.e. what is usually referred to as \*polyopia). Klüver uses the term ‘objective’ polyopia in opposition to the terms \*hallucinatory polyopia and \*imaginal polyopia.

### Reference

Klüver, H. (1966). *Mescal and Mechanisms of hallucinations*. Chicago, IL: University of Chicago Press.

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## Objective Tinnitus

The term objective tinnitus refers to a rare type of \*tinnitus (i.e. ‘ringing in the ears’) characterized by a click or a crackling noise that can be perceived not only by the individual affected but also by a third person, either with the aid of a stethoscope, in the areas surrounding the ear, or without the use of any artificial aids – as emanating from the affected individual’s ear. It has been estimated that objective tinnitus makes up no more than 5% of all cases of tinnitus. Objective tinnitus is attributed to a variety of muscular and vascular conditions. It may present as a sound that

beats simultaneously with the individual’s pulse, in which case it is called \*pulsatile tinnitus. The term objective tinnitus is used in opposition to \*subjective tinnitus, which denotes a type of tinnitus that can only be perceived by the affected individual.

### Reference

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## Obscuration

The term obscuration comes from the Latin adjective *obscurus*, which means dark. It translates as ‘darkening’. The term is used to denote a transient loss of visual perception. Such losses of visual perception typically last no longer than a few seconds. Pathophysiologically, obscuration is associated with compression of the optic nerve head perfusion, which is in turn attributed to raised intracranial pressure, as in sneezing, coughing, and straining. Etiologically, obscuration is associated primarily with papilledema and optic disc drusen. Conceptually as well as phenomenologically, obscuration should not be confused with \*scieropia, \*scierneuropia, and \*achromatopsia.

**Reference**

Kosmorsky, G.S., Rosenfeld, S.I., Burde, R.M. (1985). Transient monocular obscuration-? amaurosis fugax: A case report. *British Journal of Ophthalmology*, 69, 688–690.

**Obsessional Hallucination**

The French term *hallucination obsédante*, which translates as obsessional hallucination, was introduced in or shortly before 1895 by the French psychiatrist Louis Jules Ernest Ségla (1856–1939) to denote a \*hallucination proper accompanied by all the symptoms characteristic of an obsession, including anxiety, distress, and discomfort. The term is used by Ségla in opposition to the term *obsession hallucinatoire* (i.e. \*hallucinatory obsession), which refers to an obsessional fear of experiencing hallucinations. As Ségla maintains, hallucinations in obsessional patients “can be primary (*primitive*) or secondary: the former or ‘obsessional hallucination’ (*hallucination obsédante*) is an independent hallucination – verbal, auditory, visual or motor – that is experienced by the patient in an obsessional way, e.g. as in onomatomania; the latter or hallucinatory obsession (*obsession hallucinatoire*) consists of a hallucination that has developed out of an obsession”. The notions of hallucinatory obsession and obsessional hallucination should not be confused with the notion of \*compulsive hallucination, which has a related, but slightly different meaning. All three types of hallucination have been described in individuals with a clinical diagnosis of obsessive-compulsive disorder and/or \*schizophrenia, but they may also occur in association with other conditions, as well as in individuals without a psychiatric diagnosis.

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Ségla, J. (1895). *Leçons cliniques sur les maladies mentales et nerveuses*. Paris: Asselin et Houzeau.

**Obsessive Speaking**

see Motor hallucination.

**Octave Illusion**

see Musical illusion.

**Ocular Spectra**

see Illusive perception.

**Oculomotor Macropsia**

A term used to denote a \*magnification (i.e. an apparent increase in size) of a visually perceived object or stimulus that is attributed primarily to accommodation and divergence of the eyes. It is conceptualized as a \*physiological illusion that occurs when one views objects farther away than a metre, while the eyes are in their resting focus position, i.e. focused at a distance of about 1 m. Oculomotor macropsia may play a role in the mediation of the \*Moon illusion. The term is used in opposition to \*oculomotor micropsia.

**Reference**

Ross, H., Plug, C. (2002). *The mystery of the moon illusion. Exploring size perception*. Oxford: Oxford University Press.

**Oculomotor Micropsia**

see Convergence micropsia.

**Old Age and Hallucinations**

In biomedicine the notion of old age tends to refer to the age group of 65 years and older. Within the group of non-institutionalized individuals thus defined, the mean incidence and prevalence of hallucinations are somewhat higher than in the younger age groups, especially for those experienced in the visual modality. This increase in incidence and prevalence is attributed not only to the increased prevalence of diseases in old age but also to CNS changes characteristic of ageing. Based on cross-sectional surveys of clini-

cal populations, prevalence figures for hallucinations among the elderly lie between 15 and 30%. These hallucinations can occur in any of the sensory modalities. Again a significant proportion of them is \*visual in nature, as opposed to the predominantly \*auditory nature of the hallucinations found among adolescents and young adults. Visual hallucinations and \*illusions in the elderly would seem to occur especially at dusk or at other occasions where light is relatively scarce (i.e. in association with vesperal confusion). Reportedly, these hallucinations and illusions often involve human figures moving about in rows, in a straight line from one side of the visual field to the other. The affective tone of the hallucinated figures is frequently described as either impassive, menacing, or sexually laden. The affected individual often recognizes one or more deceased loved ones among the hallucinated individuals, and he or she may feel surrounded by a community of deceased acquaintances. Animals such as rats, cats, dogs, and insects can feature in these hallucinations as well (i.e. \*zoopsia), and some hallucinating individuals complain that the place where they are staying is overgrown with irregular branching forms in the shape of trees, branches, logs, or pine needles (i.e. \*dendropsia). \*Visual illusions experienced by the elderly can take the general form of a \*cognitive illusion such as a shadow being mistaken for a cat or a moving curtain for a person approaching (sometimes referred to as \*pareidolia). More specific illusions associated with old age are the \*TV sign (i.e. the mistaken impression that a person appearing on the television screen is actually present in one's home or that events presented on television are taking place inside one's home), the \*magazine sign (a similar phenomenon occurring in relation to photographs in a magazine), and the \*picture sign (a similar phenomenon occurring in relation to portraits). Some organic conditions held responsible for the raised prevalence of hallucinations among the elderly are \*sensory handicaps, \*tinnitus, Pick's disease, Lewy body dementia, Alzheimer's disease, other types of dementia, Parkinson's disease, localized cerebral lesions, metabolic disorders, \*delirium, alcoholism, and intoxication due to the use of therapeutics. Some specific types of hallucination which occur frequently among the elderly are visual hallucinations in the context of \*Charles Bonnet syndrome, the \*phantom boarder syndrome, \*bereavement hallucinations, \*sexual hallucinations, and \*musical hallucinations. Moreover, studies among the dying suggest

that some 50% of these experience \*death-bed apparitions.

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## Olfactism

The term olfactism comes from the Latin verb *ol(e)facere* (to smell). It is used in \*synaesthesia research to denote a hallucinated odour which is triggered by a sense perception in a different sensory modality. In accordance with the sensory modality involved, olfactisms are divided into categories such as optical or light olfactism, tactile or touch olfactism, pressure olfactism, kinaesthetic or movement olfactism, and temperature olfactism. The term olfactism is used in opposition to terms such as \*phonism, \*photism, and \*gustatism.

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- Stoddart, W.H.B. (1926). *Mind and its disorders. Fifth edition*. London: H.K. Lewis & Co.

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## Olfactory Aura

The term olfactory aura comes from the Latin words *ol(e)facere* (to smell) and *aura* (breeze, smell). It is used to denote a type of \*aura manifesting itself in the form of an \*olfactory hallucination or \*parosmia (i.e. an olfactory \*illusion). The olfactory aura has been described since ancient times. It is mentioned in combination with a \*gustatory aura, occurring in the context of epilepsy, by the classical physician Aretaeus of

Cappadocia (c. AD 150). Etiologically, the olfactory aura is associated primarily with paroxysmal neurological disorders such as migraine and epilepsy. Pathophysiologically, it is associated primarily with aberrant neuronal discharges in the uncinate gyrus. The prevalence of olfactory auras in individuals with epilepsy varies from 0.9 to 16%. This relatively wide range may be due to differences in population sampling and clinical rating. Phenomenologically, olfactory auras can be indistinguishable from \*gustatory auras because of the close relation that exists between the senses of taste and smell. When olfactory hallucinations or parosmia occur in conjunction with hallucinations in any of the other sensory modalities, or with alterations in the sense of familiarity, they can under certain conditions be designated as a \*psychic aura.

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- Mauguière, F. (1999). Scope and presumed mechanisms of hallucinations in partial epileptic seizures. *Epileptic Disorders*, 1, 81–91.

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## Olfactory Flashback

The term olfactory flashback is indebted to the Latin verb *ol(e)facere*, which means to smell. In the literature on \*post-traumatic stress disorder (PTSD) the term olfactory flashback is used to denote an infrequently reported type of \*flashback, taking the form of an \*olfactory hallucination that mimics a smell previously experienced during a traumatic event.

### Reference

- Burstein, A. (1987). Olfactory hallucinations. *Hospital and Community Psychiatry*, 38, 80.

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## Olfactory Hallucination

Also known as phantosmia, phantom smell, and hallucination of smell. The term olfactory hallucination is indebted to the Latin verb *ol(e)facere*, which means to smell. Using source localization as a guiding principle, olfactory hallucinations can be differentiated into \*intrinsic and \*extrinsic olfactory hallucinations, i.e. hallucinated smells attributed by the affected individual to a source within or outside the body. Both types of hallucination are notoriously difficult to distinguish from other \*chemosensory disorders (notably \*gustatory hallucinations) and real odours. The difficulty involved in establishing the presence or absence of olfactory hallucinations has to do with the fact that the quality of olfactory percepts depends on a number of factors. These include the prior presence of food or drink in the oral cavity, smoking, the use of perfume or other odorants, the use of therapeutics and illicit substances, and local or general medical conditions such as rhinitis, sinusitis, oral candidiasis, and influenza. As a consequence, it may be difficult to distinguish olfactory hallucinations from tastes and smells induced by a substance or disease. Second, the assessment of olfactory hallucinations is complicated by the close relationship between the senses of taste and smell, so that olfactory hallucinations can easily be confused with gustatory ones. A third difficulty involved in the assessment of olfactory hallucinations is the existence of various \*smell disorders that are not strictly speaking classified as hallucinations. This group of smell disorders comprises five broad categories: anosmia, hyposmia, \*dysosmia, \*hyperosmia, and smell agnosia. Olfactory hallucinations can be experienced in a multitude of ways. As noted in 1911 by the Swiss psychiatrist Eugen Bleuler (1857–1939), “The schizophrenic hallucinations of taste and smell have no special characteristics. The patients taste sperm, blood, feces, and all sorts of poison in their food. Soap is tasted in the noodles; grease in the coffee. Something dusty and something bitter in taste is blown toward them. Bad smells and poisons are forced into their mouths so that they have no other recourse than to stuff their mouths full of wool or rags, till they turn blue. ‘The meat stinks as if a golden egg had been squashed on it.’ The room smells of corpses, of chloroform, of tar, of ‘snake-sweat’. The bed smells bad; it has been soiled by onion skins and tobacco. One patient smells his

own masturbation. In ecstatic conditions, all sorts of pleasant odors appear. A female patient smells a heavenly taste in her mouth and nose when she attends the service of a certain minister." When olfactory hallucinations are experienced as emanating from the oral cavity, the term \*hallucinated halitosis applies. Transient \*stereotypic olfactory hallucinations that either precede an attack of migraine or an epileptic seizure, or occur without being followed by such a paroxysmal neurological event, are usually referred to as \*olfactory auras. When olfactory hallucinations or parosmia occur in conjunction with hallucinations in other sensory modalities or with alterations in the sense of familiarity, they can be designated – under certain conditions – as a \*psychic aura. In clinical practice, olfactory hallucinations tend to call forth an association with epilepsy or migraine. However, empirical research indicates that their prevalence is much higher in individuals with a clinical diagnosis of depression, \*schizophrenia, or \*olfactory reference syndrome. Other conditions in the context of which olfactory hallucinations have been described include paraphrenia, delusional states, neurotic illness, organic brain disease, and toxic states. They can also occur in individuals without any demonstrable psychiatric or neurological illness. Pathophysiologically, olfactory hallucinations are associated primarily with aberrant neuronal discharges in the uncinate gyrus.

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### Olfactory Illusion

Also known as smell illusion. The term olfactory illusion is indebted to the Latin verb *ol(e)facere*, which means to smell. It refers to an aberrant olfactory sensation experienced in the presence of an actual odour. The group of olfactory illusions comprises \*dysosmia, \*hyperosmia, and \*parosmia. The olfactory illusion is commonly classified as a \*chemosensory disorder.

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### Olfactory Phantasma

see Olfactory hallucination.

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### Olfactory Reference Syndrome

The term olfactory reference syndrome is indebted to the Latin verbs *ol(e)facere* (to smell) and *referre* (to report, to convey, to refer). It was introduced in or shortly before 1971 by the Canadian neurologist William E.M. Pryse-Phillips to denote a condition characterized by \*olfactory hallucinations which the affected individual believes to be emanating from his or her own body (i.e. an \*intrinsic olfactory hallucination). The hallucinated smells reported by individuals with an olfactory reference syndrome are typically excretory or sexual in nature (i.e. sweat, faeces, urine, sperm, menstrual blood, etc.). A hallucinated foul breath emanating from the oral cavity is referred to as \*hallucinatory halitosis, so as to distinguish it from an objectifiable foul breath (i.e. halitosis). The term olfactory reference syndrome is used when there is no insight into the hallucinatory nature of the foul odour, and when the affected individual develops delusions of reference on the basis of this symptom, to the extent that he or she believes persons in their environment are showing signs of aversion or disgust. As noted by Pryse-Phillips on the



basis of a study of a group of 137 individuals with olfactory hallucinations and varying clinical diagnoses, individuals with an olfactory reference syndrome "displayed a marked 'concrete' reaction in response. They washed their bodies and changed their clothes to excess, and tended to withdraw from their environment, particularly from social events". According to Pryse-Phillips, a similar behavioural pattern in individuals suffering from bodily hallucinated smells was reported as early as 1891 by an American author named C.S. Potts. Although Pryse-Phillips distinguishes the olfactory reference syndrome from olfactory hallucinations occurring in the context of depressive disorder, he suggests that it has a significant potential to develop into a reactive type of depression.

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### Oliver Sacks's Syndrome

see Musical hallucination.

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### Ololiuqui-Induced Hallucination

Ololiuqui is known under many names. It is also spelled as *ololiuqui*, *ololiuhqui*, and *qloliuhqui*. These names mean 'round thing' in the Aztec language Nahuatl, and refer to the small, brown, oval seeds of the American vine *Rivea corymbosa*, which is also known as *Turbina corymbosa*, ololiuqui vine, and morning glory. The principal psychoactive compound of these seeds, discovered during the 1960s by the Swiss chemist and philosopher Albert Hofmann (1906–2008), is D-lysergic acid amide (LSA) or ergine, an ergot alkaloid that is chemically related to LSD, but is less potent. In prehispanic times, ololiuqui was used by the Aztecs for visionary, divinatory, aphrodisiac, and therapeutic purposes. The first Westerner who described the drug was the Spanish physician Francisco Hernández (1515–1587). The botanical origin of ololiuqui has remained a

mystery until well into the 20th century. In 1941 it was elucidated by the American father of ethnobotany Richard Evans Schultes (1915–2001). Ololiuqui is obtained from the fresh or dried seeds of *T. corymbosa*. It is administered orally, dissolved in water or in an alcoholic beverage such as *mescal* or *aguardiente*. Its \*hallucinogenic effects have sometimes been compared to those of LSD. However, according to the German anthropologist and ethnopharmacologist Christian Rätsch (b. 1957) ololiuqui tends to produce a hypnotic state rather than a psychedelic state, characterized by a trance or twilight sleep with lively \*dream images. Acknowledging the visionary effects of the drug reported by shamans, Rätsch speculates that these may be due to cultural conditioning or to special skills known exclusively to shamans. A person intentionally employing ololiuqui for the purpose of exploring the psyche may be called a \*psychonaut.

#### References

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- Rudgley, R. (1998). *The encyclopaedia of psychoactive substances*. London: Little, Brown and Company.

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### Oneirism

The term oneirism comes from the Greek noun *oneiros*, which means \*dream. It also refers to the \*Oneiroi, the gods of dreams featuring in Greek mythology. The term is used to denote an imaginative, dream-like thought or \*illusion, experienced while one is awake. It is sometimes used as a synonym for \*daydream.

#### Reference

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### Oneirogagic Image

see Hypnagogic hallucination.

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## Oneiroi

The name Oneiroi is related to the Greek noun *oneiros*, which means \*dream. In Greek mythology, the Oneiroi feature as gods in the service of Hypnos, the god of sleep. According to the Roman poet Publius Ovidius Naso, better known as Ovid (43 BC–AD 17), there are three Oneiroi: \*Morpheus, the god associated with the human element in dreams, his brother \*Phobetor, associated with animal forms, and his other brother \*Phantasos, associated with inanimate objects. In an alternative reading, Morpheus is considered the most powerful god of dreams, charged with the task of governing the dream as a whole.

### Reference

Ovid (1986). *The metamorphoses*. Translated by Melville, A.D. Oxford: Oxford University Press.

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## Oneiroid Hallucination

The term oneiroid hallucination is indebted to the Greek noun *oneiros*, which means dream. It also refers to the \*Oneiroi, the gods of dreams featuring in Greek mythology. The term oneiroid hallucination translates loosely as ‘dream-like hallucination’. It was introduced by the French classical scholar and dream researcher Louis-Ferdinand-Alfred Maury (1817–1892), who suggested that the false perceptions of \*dreams, \*delirium, and \*hallucinations proper have a common origin. Due to a nervous breakdown, Maury had first-hand experience of hallucinations. He postulated a mechanism called \*oneirism to denote an uninterrupted process of \*dream activity which may be drowned out by \*sensory perceptions, but which under certain peculiar circumstances may gain the upper hand during one’s waking hours. It was also Maury who in 1848 introduced the term \*hypnagogic hallucination to denote the introductory nature of these phenomena as they lead the individual into sleep.

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## Onomatomania

see Motor hallucination.

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## Ophthalmopathic Hallucination

The term ophthalmopathic hallucination is indebted to the Greek words *ophthalmos* (eye) and *pathos* (suffering). It is used to denote a \*visual hallucination occurring in individuals suffering from a visual impairment, as in \*Charles Bonnet syndrome. The adjective ophthalmopathic refers to the purported mediation of these visual hallucinations: not by an ocular condition per se but by a lesion that may affect any part of the optical system. Ophthalmopathic hallucinations tend to manifest themselves in the impaired visual field, but they can also present within the intact field of vision. Phenomenologically, these hallucinations usually take the form of complex images depicting objects or human beings which may or may not be moving about. They have also been described as hallucinations filling the whole field of vision, with a fracture line at the border line between the amaurotic and intact hemifields.

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## Opiates and Hallucinations

see Opioid-induced hallucination.

## Opioid-Induced Hallucination

Also referred to as \*narcotic hallucinosis. The term opioid-induced hallucination is indebted to the Greek noun *opion*, which refers to the sap of a plant – or, more specifically, the resin of the opium poppy. The term opioid is used to denote a group of chemical substances with morphine-like effects. This group of substances is usually divided into four or more broad subclasses, comprising the natural opiates (i.e. a group of more than 40 opium alkaloids contained in the resin of the opium poppy, including morphine, codeine, thebaine, narcotine, and papaverine), the semi-synthetic opiates (i.e. a group of substances synthesized out of the natural opioids, including hydromorphone, hydrocodone, oxycodone, and heroin), the fully synthetic opioids (including fentanyl, pethidine, methadone, and propoxyphene), and the endogenous opioid peptides (including the endorphins, enkephalins, dynorphins, and endomorphins). The term opiate is usually reserved for the groups of the natural and semi-synthetic opioids. It is used to denote the congealed juice, or latex, derived from the seed pods of the opium poppy *Papaver somniferum*, which is won by making incisions in the seed pods and then collecting the latex (called ‘tears of the Moon’ or ‘tears of Aphrodite’ in ancient Greece). Psychoactive substances can also be found, albeit in smaller quantities, in the leaves, seeds, and roots of the opium poppy. Throughout human history, many opioid preparations have been manufactured. A well-known example is laudanum (also known as ledanum and labdanum), i.e. a mixture of 90% wine and 10% opium, introduced around 1530 by the Swiss alchemist and physician Paracelsus (1493–1541). Opioids can be administered orally, intravenously, subcutaneously, rectally, or through smoking. They have been used since ancient times as sedatives, aphrodisiacs, analgesics, potions, therapeutics, incenses, smoke offerings, \*hallucinogens, and \*entheogens. The use of opioids is extremely addictive. Chronic users tend to need ever-increasing dosages to equal the initial effects. The many adverse effects of opioid use include flushing, urticaria, obstipation, urinary retention, respiratory depression, hypothermia, bradycardia, tachycardia, ortho-

static hypotension, vertigo, headache, muscle rigidity, myoclonus, euphoria, sedation, lively \*dreams, hallucinations, and \*delirium. Overdosing can be lethal. Opioid-induced hallucinations tend to be \*visual, \*auditory, or \*compound in nature. The content of opioid-induced hallucinations is often described as blissful, paradisiacal, and/or sexually charged in nature. Moreover, many historical reports exist of opium-induced visions involving the plant itself, depicted either in its vegetable state or in the form of a beautiful, loving woman or goddess. As the French artist Jean Maurice Eugène Clément Cocteau (1889–1963) wrote, “Opium is the only vegetable substance that communicates the vegetable state to us. Through it, we can get an idea of that other speed of plants.” Among the auditory hallucinations, \*musical hallucinations have been reported as well. In the parapsychological literature it is sometimes claimed that the opioids can induce \*telepathic or \*clairvoyant states. The mechanism of action of opioids is thought to involve specific opioid receptors (which are distributed throughout the CNS, spinal cord, and peripheral organs), as well as the opioid-receptor-like receptor 1 (ORL1). Both types of receptors are classified as G-protein-coupled receptors. Their effects upon the CNS are associated primarily with an agonistic action upon GABA-ergic neurotransmitters. A person intentionally employing opioids for the purpose of exploring the psyche may be called a \*psychonaut.

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### Oppel Illusion

see Oppel–Kündt illusion.

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### Oppel–Kundt Illusion

Also known as Oppel illusion, filled-space illusion, and filled/unfilled space illusion. The eponym Oppel–Kundt illusion refers to the German physicists Johann Joseph Oppel (1815–1894) and August Adolph Eduard Eberhard Kundt (1839–1894), who have both been credited with describing specific aspects of the concomitant \*geometric-optical illusion described by Oppel in 1854. The Oppel–Kundt illusion involves the subjective impression that a distance divided by graduated lines is longer than a similar, yet undivided distance. This principle is also referred to as Kundt's rule. As early as the fourth century BC, this illusion was described by the Greek philosopher Aristotle (384–322 BC) in his book *Problems*. As Aristotle's text describes the divided line as appearing *shorter*, while it is known to appear *longer*, it has been suggested that it may not have been written by Aristotle but by one of his pupils. As is the case with other geometric-optical illusions, the Oppel–Kundt illusion is considered a physiological phenomenon that arises as a consequence of the inherent properties of the visual system – which prompts the brain to calculate a 'weighted mean value' that is spread out over a population of neurons, and leads the observer to overestimate the divided distance in comparison to the undivided one. The Oppel–Kundt illusion is generally classified as a geometric-optical illusion, which itself tends to be classified as a subtype of the \*optical illusions.

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### Optical Allachaesthesia

see Visual allachaesthesia.

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### Optical Alloaesthesia

see Visual allachaesthesia.

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### Optical Allochiria

see Visual allachaesthesia.

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### Optical Hallucination

see Visual hallucination.

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### Optical Halo

see Halo.

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### Optical Illusion

The term optical illusion is used in a narrow and a broad sense. In the narrow sense, it denotes an illusion attributable to the optics of the eye. In the broad sense, it is used as an equivalent of the term \*visual illusion, denoting any aberrant visual percept that has a basis in an object or stimulus deriving from the extracorporeal environment. This broad class is sometimes divided into \*physical, \*physiological, and \*cognitive optical illusions. The latter division is based on the conventional assumption that some illusions tend to occur as a natural consequence of the physical properties of an object or stimulus, whereas others depend on the inherent workings of the perceptual system or on the interaction between the perceptual input picture and the mind's (or brain's) unconscious inferences pertaining to the nature of the physical world. However, in all three cases a percept is created that differs from the physical measurements of the stimulus source at hand. Depending on the guiding principles employed, optical illusions can be further divided into subgroups such as the \*ambiguous illusion, \*distortion illusion, \*geometric-optical illusion, \*paradox illusion, and \*fiction illusion. Some well-known examples of optical illusions are the

\*Müller-Lyer illusion, the \*Oppel–Kundt illusion, the \*Poggendorff illusion, and the \*Zöllner illusion. The German physicist Johann Joseph Oppel (1815–1894) has been credited with initiating the scientific study of optical illusions in 1854, after his attention had been drawn to certain regularly recurring flaws in his students' drawings.

#### References

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### Optical Paradox

A term introduced in or shortly before 1892 by the German philosopher and psychologist Franz Clemens Honoratus Hermann Brentano (1838–1917) to denote an \*optical illusion such as the \*Müller-Lyer illusion.

#### Reference

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### Optogeometric Illusion

see Geometric hallucination.

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### Ordinal-Linguistic Personification (OLP)

A term used to denote a form of \*synaesthesia in which individual members of ordered sequences, such as ordinal numbers, days, months, and letters, are associated with personalities. Although the phenomenon itself was described as early as 1893 by the French psychologist Théodore Flournoy (1854–1920), it has attracted the interest of present-day scientific researchers. OLP should not be confused with the notion of

\*personification, which stands for a \*compound hallucination depicting a human being.

#### References

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### Organic Autorepresentation

see Internal autoscapy.

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### Organic Hallucination

A term used to denote a hallucination which is attributed to an organic disorder, as in \*organic hallucinosis.

#### Reference

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### Organic Hallucinosis

A term used to denote a syndrome characterized by persistent or recurrent hallucinations occurring in the unclouded mind, attributable to a manifest organic disorder. Organic hallucinosis is believed to occur in the absence of other psychotic symptoms or significant intellectual decline. The hallucinations attributed to it are usually \*visual or \*auditory in nature, although other types of hallucination may also occur. Etiologically, the syndrome is associated with a variety of somatic disorders, including intracranial pathology (due, for example, to a brain tumour, a head injury, neurosyphilis or other infections, epilepsy, or migraine), endocrine diseases (such as hypothyroidy), Huntington's disease, psychoactive substance abuse (including intoxication with alcohol, cocaine, amphetamines, or a \*hallucinogen), intoxication with therapeutics, and chronic \*sensory deprivation (due, for example, to \*hearing loss or poor vision, as in \*Charles

Bonnet syndrome). Despite the clause involving the required absence of intellectual decline, the term is sometimes also applied to hallucinatory states in individuals suffering from Lewy body disease or other types of dementia. The term organic hallucinosis is used by the French psychiatrist Henri Ey (1900–1977) in opposition to the term \*psychotic hallucination. In general, it is used to express the suspicion of an etiological relation between the hallucinations in question and some manifest physical condition. Although useful from a clinical point of view, the notion of organic hallucinosis would seem to suffer from various conceptual problems. As the German psychiatrist and philosopher Karl Jaspers (1883–1969) points out, “‘Organic’ implies the morphological, the anatomical and what is physically manifest; ‘functional’ implies the physiological, what manifests itself only in the form of a happening and in bodily performance, without morphological change. Further, ‘organic’ implies what has happened irreparably, incurable illness; ‘functional’ implies the reparable event and a curable illness. The opposition of the two is obviously not absolute. What starts psychogenically and manifests itself functionally can become organic. What is organic can manifest itself in some reparable functional event.” In the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders*, the diagnostic category organic hallucinosis entered the third edition, published in 1980, and disappeared during the preparatory phase for the fourth edition. As a nosological category, organic hallucinosis is classified as a specific type of \*hallucinosis syndrome.

#### References

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- Jaspers, K. (1997). *General psychopathology. Volume 2*. Translated by Hoenig, J., Hamilton, M.W. Baltimore, MA: Johns Hopkins University Press.

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### Organic Twilight State

see Twilight state and hallucinations.

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### Organization Phase

A term used to denote a reaction type which comes second in a series of three reaction types described in hallucinating individuals, during which the initial astonishment of the \*startling phase typically abates. The term stems from the Dutch hallucination experts Marius Romme (b. 1934) and Sandra Escher (b. 1945). In some individuals, the organization phase may never cease. In others, it may be followed by a \*stabilization phase, during which the initial confusion has disappeared, and the individual has learned to deal with his or her hallucinatory experiences.

#### References

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### Organized Hallucination

see Formed hallucination.

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### Original Afterimage

A term used to denote an \*afterimage that is seen in complete darkness, after exposure of the eye to a primary stimulus. The original afterimage is usually classified as a \*physiological illusion.

#### Reference

- Brown, J.L. (1965). *Afterimages*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: Wiley.

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### Orthographic Hallucination

The term orthographic hallucination is indebted to the Greek words *orthos* (straight) and *graphein* (to draw, to write, to etch, to paint). It translates loosely as ‘a hallucination involving letters and spelling’. The term is used to denote a \*visual hallucination consisting of written letters, words,

or musical notes. It has been suggested that the mediation of orthographic hallucinations is associated primarily with aberrant neuronal activity in the visual word form area, located in the ventral temporal lobe. When orthographic hallucinations present in the form of a written text they are referred to as \*visual text hallucinations. When these convey an incentive or command, they may be called \*visual command hallucinations.

#### Reference

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### Oscillopsia

Also known as bouncing vision. The term oscillopsia comes from the Latin verb *oscillare* (to rock, to swing) and the Greek verb *opsis* (seeing). It is used to denote a visual distortion in which the extracorporeal environment as a whole appears to oscillate. Depending on the amplitude of the oscillation, it may present as a mild blurring of vision or as an instable, jerky type of vision in which the extracorporeal environment would seem to swing, to move back and forth, or to wiggle. Vertical oscillopsia is characterized by oscillations in the vertical plane co-occurring with up- and downward movement of the head (as in locomotion) or with vertical nystagmus. Two other types of oscillopsia, i.e. horizontal and rotational oscillopsia, are associated primarily with nystagmus. The occurrence of oscillopsia is normally prevented by central cancellation, a process in which the vestibulo-ocular response plays an important role. Pathophysiologically, oscillopsia is attributed to 'retinal slip', i.e. an excessive slip of images on the retina, due to failure of the vestibulo-ocular response, as may occur in the context of conditions such as superior canal dehiscence syndrome, multiple sclerosis, and intoxication with gentamicin. Oscillopsia affects the whole field of vision and should not be confused with the \*autokinetic effect.

#### References

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oscillopsia in bilateral superior canal dehiscence syndrome. *Neurology*, 62, 784–787.

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### Osis and Haraldsson's Definition of Hallucinations

In 1977, the parapsychologists Karlis Osis (1917–1997) and Erlendur Haraldsson (b. 1931) defined hallucinations as follows: "Hallucinations are a form of mental imagery involving sensory qualities similar but not corresponding to sensory input (which is the normal basis of perceptual imagery)... That which singles out hallucinations from all other kinds of imagery is the fact that the person is awake during them and experiences the same sensation of realness regarding the image as he or she does when perceiving real objects... Therefore, it might be said that a *hallucination is imagery coupled with a misapplied sense of realness*. However, a sense of realness in ESP-based hallucinations is appropriate because of their correspondence with a kind of external reality that is not within reach of the perceptual organs."

#### Reference

Osis, K., Haraldsson, E. (1977). *At the hour of death*. New York, NY: Avon Books.

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### Otic Tinnitus

Also known as peripheral tinnitus. Both terms are used to designate a type of \*tinnitus (i.e. 'ringing in the ears') attributed to disorders of the inner ear and, in some definitions, to the acoustic nerve. The term otic tinnitus is used in opposition to the terms \*somatic tinnitus and \*central tinnitus.

#### References

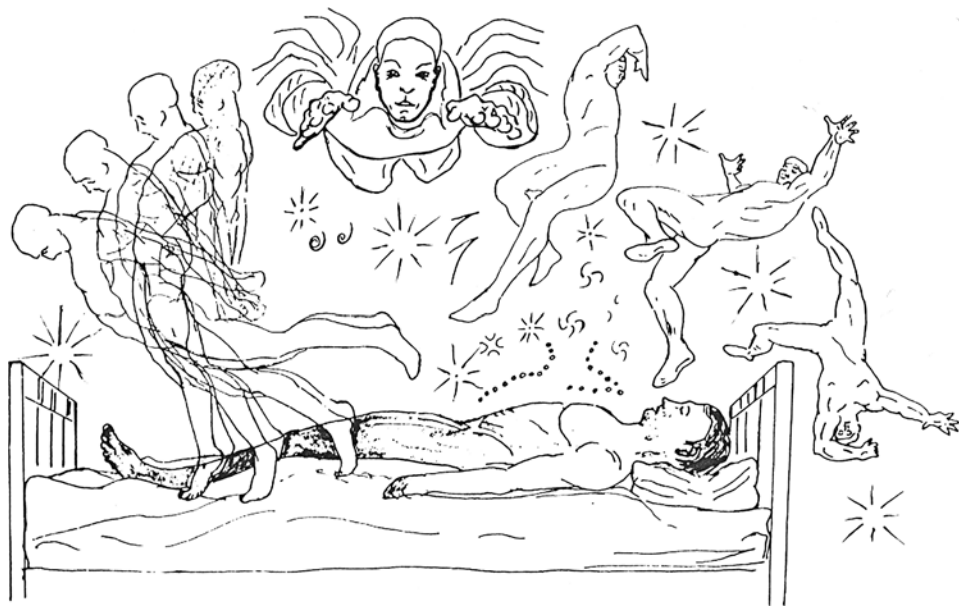
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Vernon, J.A., Sanders, B.T. (2001). *Tinnitus. Questions and answers*. Boston, MA: Allyn and Bacon.

## Out-of-Body Experience (OBE or OOBE)

Also known as out-of-the-body experience. In biomedicine, both terms are used to denote a type of \*autoscopy phenomenon that may occur either during sleep or wakefulness, involving a sensation of being outside and above one's physical body (referred to as disembodiment). The experience is typically accompanied by \*autoscopy, which in OBE involves the visual perception of one's physical body from a place outside of one's actual body. Contrary to autoscopic doubles perceived in \*heautoscopy, which tend to appear diaphanous, the physical body perceived in OBE tends to appear as solid and to cast a shadow. When instances of OBE and heautoscopy are experienced in rapid alternation, they are referred to as \*double consciousness. It has been claimed that the lifetime prevalence of OBE may lie around 10%. OBE may be accompanied by other hallucinations or \*illusions, such as \*auditory hallucinations and \*body photism. Pathophysiologically, OBE is associated pri-

marily with aberrant neurophysiological activity at the temporo-parieto-occipital junction. It has been claimed by the group headed by the American-Canadian neuropsychologist Michael A. Persinger (b. 1945) that OBE can be evoked experimentally with the aid of a \*Koren helmet. In parapsychology, OBE tends to be attributed to true exteriorization of the self, the soul, or any other 'ethereal' part of the body. An example of such exteriorization is astral projection, a condition in which the so-called astral body is thought to part from the physical body, and to undertake a tour of the physical plane, thus allowing for the proper physical distance to render autoscopy possible. According to the American parapsychologist Raymond A. Moody, Jr. (b. 1944), OBE is also a common characteristic of \*near-death experiences (NDEs). Synonyms for OBE found in the parapsychological literature include astral projection, escomatic experience, 'ecstasy with looking back at oneself', exteriorization of sensibility, excursion of the ego, hallucination of physical duality, pseudoheautoscopy, syndrome of floating experience, and visuo-



**Fig. 1** Out-of-body experience. Source: Mavromatis, A. (1987). *Hypnagogia. The unique state of consciousness between wakefulness and sleep*. London: Routledge. Reproduced with permission



vestibular splitting of the somatosensory body image.

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## Out-of-the-Body Experience

see Out-of-body experience.

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## Output Model of Hallucinatory Activity

In hallucinations research, the term output model is used as a generic term for a group of explanatory models which emphasize the role of information production areas (as opposed to information reception areas) in the mediation of hallucinations. The term output model derives from a

general information-processing model known as the input–output model. This model is conceptualized as a set of rules or laws describing a fixed sequence of preset operations that determine a circuit's output for any given type of input. Given the assumption that \*verbal auditory hallucinations can be mediated by any part of the so-called inner voice–inner ear circuit, output models of verbal auditory hallucinatory activity emphasize the role of Broca's area (i.e. the speech production area). In this context, input models emphasize the role of Wernicke's area (i.e. the speech perception area), as well as the effect of exogenous information upon Wernicke's area.

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## Over-Recruitment

see Hyperacusis.

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**PAD Model**

see Perception and Attention deficit model.

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**Palihaptic Phenomenon**

see Tactile polyaesthesia.

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**Palinacousis**

see Palinacousis.

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**Palinacousis**

Also known as palinacousis and auditory perseveration. The term palinacousis comes from the Greek words *palin* (again) and *akouein* (to hear). It refers to a rare symptom involving the persistence or paroxysmal recurrence of auditory percepts, analogous to the persistence or recurrence of visual images in \*palinopsia, and the recurrence of tactile sensations in \*tactile polyaesthesia. As noted by the American neurologists Lawrence D. Jacobs (1938–2001) et al., “Palinacousis is a paroxysmal auditory illusion in which aural sensations produced by diverse environmental sounds, such as speech and music, persist or recur for variable periods of time after

the initial acoustic stimulus has ended. The palinacoustic sensations, which seem to emanate from a real source located in external auditory space, are usually quite vivid and may be indistinguishable from the sound of the actual acoustic event, whether it be a telephone ring, engine noise, or the yowling of a dog.” The first known description of palinacousis was published in 1965 by the Russian-American neurologist Morris Boris Bender (1904–1983) and his colleague Sidney P. Diamond. Jacobs et al. have been credited with publishing the most extensive and detailed description of palinacousis to date, based on their observations in seven affected individuals. The perseverative auditory percepts in palinacousis tend to be designated as \*illusions, but they can also be classified as hallucinations. In general, however, they are classified as \*reduplicative phenomena. Of the sounds reported by individuals with palinacousis, human voices are the most prevalent, with utterances varying in length from a single word to a whole phrase. Palinacoustic percepts are reported as commencing immediately after the original acoustic event, or up to 24 h later. They may persist for days to months, typically recurring several times a day. The quality of the perseverated sounds can be poorer or richer than the original acoustic event (i.e. either ‘muffled’, or ‘louder’ and ‘sharper’). The perseverated sounds may or may not be accompanied by additional nonverbal sounds such as ringing, hissing, whistling, rushing, tinkling, and crackling. They may be restricted to a single sound, but the account of a person with more than 30 different palinacoustic experiences was also

reported by Jacobs et al. Sometimes palinacoustic experiences can be stopped by covering the ear. Pathophysiologically, palinacusic is associated primarily with focal temporal seizure discharges occurring in the context of an \*aura or a \*dreamy state. It has also been reported in the aftermath of epileptic seizures, i.e. as a postictal or interictal event. Comorbid symptoms in palinacusic may include \**déjà vu* and *déjà entendu* experiences, illusions and hallucinations in any of the other sensory modalities, palinopsia, \*synaesthesias, paroxysmal agitation, confusion, aphasia, and amnesia. Episodes of palinacusic may be followed by a generalized epileptic seizure. When the seizures are managed appropriately, the palinacoustic experiences tend to vanish as well. Etiologically, palinacusic is associated primarily with organic lesions affecting the temporal lobe, such as a tumour, haemorrhage, or infection. Palinacusic has also been reported in an individual with a thalamus infarction, and in individuals with a clinical diagnosis of hysteria or \*psychotic disorder. Phenomenologically, palinacusic bears a certain similarity to \**Gedankenlautwerden* or thought echoing, a phenomenon characterized by the echoing of one's own conscious thoughts. Pathophysiologically, however, the two phenomena would seem to be quite different.

### References

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## Palinaesthesia

see Tactile polyaesthesia.

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## Palinopsia

Also referred to as pseudodiplopia. The term palinopsia comes from the Greek words *palin*

(again) and *opsis* (seeing). It translates as ‘seeing again’ or ‘seeing multiple identical copies’. The original term for this group of visual phenomena was \*paliopsia, a neologism introduced in or shortly before 1949 by the British neurologist Macdonald Critchley (1900–1997). In 1954 the spelling was modified to palinopsia by the Austrian neurologist and psychiatrist Otto Pötzl (1877–1962). Both terms refer to a group of visual images that persist or recur paroxysmally after the original object or stimulus has moved out of sight. Palinopsia may present either in the form of multiple repetitions of a single image (called \*polyopia), in the form of persisting \*afterimages (either positive or negative), or as a \*trailing phenomenon (i.e. a series of stationary images that trail behind a moving object or stimulus). These images typically last as long as the percipient's gaze is moving or reappear after seconds to minutes. An example of palinopsia given by Critchley runs as follows: “After a person had walked past the foot of the bed from left to right, and then had gone away, she had a moment or two later the impression as if the same person had walked past as before.” In a second example, Critchley illustrates the variant of the positive afterimage as follows: “If he looks at a thing, and looks away, he may continue to see it. Things he thinks about a lot do not go out of his vision quickly, as if they were slow in being switched off.” It has been claimed that palinopsias may also reappear after months or years. In the latter case, they are referred to as \*long-latency palinopsias. Conceptually as well as phenomenologically, it may be hard – if not impossible – to differentiate long-latency palinopsias from \*flashback phenomena or \*reperceptions. When objects within the visual field take on the colours or patterns of neighbouring objects, the term \*illusory visual spread is used. Both phenomena are classified by Critchley as types of \*visual perseveration, a phenomenon which is in turn classified as a \*reduplicative phenomenon or a type of \*metamorphopsia. Equivalents of palinopsia in the auditory and tactile modes of perception are known as \*palinacusic (involving the persistence or paroxysmal recurrence of auditory percepts) and \*tactile polyaesthesia (involving recurrent tactile sensations), respectively. Pathophysiologically, palinopsia is sometimes conceptualized as a pathological exaggeration of the afterimage. It has also been suggested that palinopsia may be mediated by pathology of the visual parietal regions. Etiologically, the symptom is asso-

ciated with a variety of conditions, including \*aurae (as in the context of paroxysmal neurological disorders such as migraine and epilepsy), hysteria, and the use of \*hallucinogens such as mescaline or LSD. It has been suggested that palinopsia may be related in a conceptual and phenomenological sense (and perhaps in a pathophysiological sense as well) to other mnestic events such as \*flashbacks occurring in the context of PTSD, drug-related flashbacks, \*hallucinogen-induced persistent perception disorder (HPPD), \*phantom pain, \*reperceptive hallucinations, \*eidetic imagery, and \*flashbulb memories.

### References

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## Paliopsia

A term coined in or shortly before 1949 by the British neurologist Macdonald Critchley (1900–1997) to denote the phenomenon known today as \*palinopsia (i.e. a visual image that persists or recurs paroxysmally after the original object or stimulus has moved out of sight). In his original paper on the subject, Critchley gives the example of a woman with a left parieto-occipital tumour who reperceived previously perceived objects within the blind half of her visual field. As he recounts, “A well-remembered object, or something which had previously attracted her attention strongly – even as long as several hours previously – would keep appearing in the blind half of her vision and would gradually float towards the mid-line, ‘like characters on a stage’. One object in particular, a little Dresden china

dog, was very apt to appear.” As Critchley continues, “Here we have the hallucinatory and continued reappearance of an object previously seen or visualized with some intensity. For this phenomenon the term ‘*paliopsia*’ may appropriately be applied.”

### References

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## Panoramic Hallucination

Also known as a \*scenic hallucination and holocampine hallucination. All three terms are used to denote a \*compound hallucination in which the entire sensory input is replaced by hallucinatory percepts, thus giving rise to a totally different perceptual reality. The British physician Henry Maudsley (1835–1918) captured this phenomenon aptly when he wrote, “In the delirium of insanity it is not an uncommon thing for the sufferer to see and hear persons who are the mere phantom-creations of his disordered brain; and when the delirium is of an acute character these are so vivid and active, and have such full possession of his senses, usurp his attention so entirely, that real persons and voices can make no impression upon him. He is cut off from the actual world by the very intensity of their turbulent activity, which inhibits or blocks the true functions of the senses, so dislocating the connections of them that they seeing see not, hearing hear not, touching feel not; like a person in a nightmare, he lives in a tumultuous ideal world.” \*Deathbed visions taking on the quality of a panoramic hallucination are sometimes referred to as \*total hallucinations.

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## Parachromatopsia

see Dichromatism.

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## Paracoenesthesiopathy

The term paracoenesthesiopathy comes from the Greek prefix *para* (beside, near, resembling, accessory to, beyond, apart from, abnormal), the medical Latin noun *coenesthesia* – which in turn comes from the Greek words *koinos* (communal) and *aisthanesthai* (to notice, to perceive) – and the Greek noun *pathos* (suffering). The term *coenesthesia* was used during the era of classic psychiatry to denote the ‘common sensation’ or ‘common general sensibility’ arising from the sum of all bodily sense impressions. (For a further explanation of the term *coenesthesia*, see the entry *Coenesthetic hallucination*.) The French term *paracœnesthésiopathie* was introduced in or shortly before 1905 by the French neurologists Paul Camus and G. Deny to denote a qualitatively altered awareness of one’s *coenesthetic* feelings. In their 1905 paper, these authors render the following clinical description of *paracoenesthesiopathy*, given by a woman experiencing the subjective sensation of having changed into a dog. “Doctor, I swear to you, I have totally changed, I am no longer a woman, but a dog, my teeth are no longer human teeth, the interior of my body has changed completely, it is a dog’s body; look at my head, it is not the same anymore.” Camus and Deny classify *paracoenesthesiopathy* as a variant of *\*coenesthesiopathy*, and use the term in opposition to the terms *\*acoenesthesiopathy*, *\*hypercoenesthesiopathy*, and *hypocoenesthesiopathy*. Today *paracoenesthesiopathy* would probably be classified as a *\*somatic hallucination* or *illusion*, a disorder of *embodiment*, or a disorder of *corporeal awareness*. Pathophysiologically, *paracoenesthesiopathy* is associated primarily with lesions affecting one or more parts of the parietal cortex involved with *embodiment* and *corporeal awareness* (more specifically, the *premotor cortex*). *Paracoenesthesiopathy* should not be confused with *\*clinical lycanthropy*, i.e. the *delusional conviction* (rather than the *sensory impression*) that one has changed into a wolf.

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## Paracusis

see *Paracusis*.

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## Paracusis

Also known as *paracusis*. Both terms stem from the Greek words *para* (beside, near, resembling, accessory to, beyond, apart from, abnormal) and *akouein* (to hear). They translate loosely as *disordered hearing*. The term *paracusis* is used in a broad sense to denote any kind of *false acoustic perception*. In a more restricted sense, it refers to a group of disturbances in the perception of isolated notes. *Paracusis* in the broad sense is commonly divided into three types, i.e. *paracusis loci* (a disturbance of spatial hearing, entailing the false localization of acoustic sources), *\*paracusis of Willis* (also known as *paradoxical deafness*), and *paracusis duplicata* (characterized by an audible echo, as sometimes experienced in Ménière’s disease). *Paracusis* in the restricted sense is divided into four subclasses, which partly overlap with the category *paracusis duplicata*. These subclasses are *diplacusis binauralis echotica* (in which sounds are heard twice, due to the time that may lapse between hearing with a healthy ear and with a diseased ear), *diplacusis monauralis echotica* (in which sounds are echoed within the diseased ear), *diplacusis binauralis disharmonica* (in which a dissonant double clang is produced, due to the disordered pro-

cessing of sounds by a diseased ear), and diplacusis qualitatis (in which the diseased ear changes the quality of notes, without altering their pitch).

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## Paracusis Duplicata

A term used to denote a type of \*paracusis characterized by an audible echo. Paracusis duplicata is associated primarily with Ménière's disease.

### Reference

- Révész, G. (2001). *Introduction to the psychology of music*. Translated by de Courcy, G.I.C. Mineola, NY: Dover Publications.

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## Paracusis Loci

A term used to denote a type of \*paracusis in which spatial hearing is disturbed, entailing the false localization of acoustic sources.

### Reference

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## Paracusis of Willis

Also known as *paracusis Willisii*, *paracusis Willisiana*, false paracusis, paradoxical hearing loss, and paradoxical deafness. The term paracusis of Willis refers to the British physician Thomas Willis (1621–1675), who is credited with having been the first to describe the concomitant phenomenon, which consists of an apparent increase in auditory acuity experienced by

individuals with conductive hearing loss when engaged in a conversation taking place against a noisy background. This phenomenon, called paracusis of Willis, has been attributed by some authors to the tendency of people to speak louder in a noisy environment. An alternative explanation is given by the French research scientist Jacques Ninio (b. 1942). After recounting Willis's anecdote about a woman who was in the habit of amplifying her auditory acuity by letting a servant beat a drum when she was spoken to, Ninio asserts that "the interpretation of this paradoxical phenomenon is that the noise, adding to the words, conveys fragments of the speech above the hearing threshold. It would be on the basis of these fragments that the hard-of-hearing woman would reconstruct the whole of the discourse that she would then have the illusion of hearing continuously."

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## Paracusis Willisiana

see Paracusis of Willis.

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## Paracusis Willisii

see Paracusis of Willis.

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## Paradox

see Paradox illusion.

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## Paradox Illusion

Also known as paradox. Both terms are indebted to the Greek words *para* (beside, near, resembling, accessory to, beyond, apart from, abnor-

mal) and *doxa* (opinion, expectation). They refer to a \*visual illusion mediated by objects or images that are paradoxical or logically impossible. Some well-known examples of the paradox illusion are the \*motion aftereffect, the Penrose triangle, and the impossible staircases in the drawing *Ascending and Descending* by the Dutch graphic artist Maurits Cornelis Escher (1898–1972). The term paradox illusion is used in opposition to the terms \*ambiguous illusion, \*distortion illusion, and \*fiction illusion.

#### Reference

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### Paradoxical Cold

A term introduced in or shortly before 1895 by the Austrian physician and physiologist Max von Frey (1852–1932) to denote the \*thermal illusion of coldness that may arise when a stimulus in the range of 45–50°C is applied to the skin. Paradoxical cold is a \*physiological illusion that may be experienced by any individual. It was described for the first time in 1879 by the German neurologist Carl Eisenlohr (1842–1896) on the basis of observations made in a patient suffering from \*anaesthesia to cold on the right side of the face and the left side of the body, attributed to a pontine vascular accident. The mediation of paradoxical cold sensations has traditionally been attributed to the activation of peripheral thermoreceptors in the skin and to the afferent conduction of action potentials by cold fibres. As Von Frey recapitulated in 1906, “If the temperature of the normal skin is slowly raised over the physiologic zero-point, first the warm spots alone are irritated and the sensations lukewarm or warm evoked, according to the intensity of the stimulus. When the temperature reaches 45° the sensation changes in a peculiar way owing to the fact that the cold-spots join in the irritation, mingling their specific sensation with the warm one.” However, it is as yet an unresolved issue whether the sensation of paradoxical cold should be attributed primarily to the cold receptors responding to heat, or to the coexistence of noxious heat receptors and cold receptors within the same fibres. The role of central mechanisms in the mediation of paradoxical cold is even less clear. Conceptually,

the notion of paradoxical cold is used in opposition to \*paradoxical heat. Both phenomena are usually classified as illusions, more specifically, as \*physiological illusions or \*perceiver-distortion illusions.

#### References

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### Paradoxical Deafness

see Paracusis of Willis.

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### Paradoxical Hearing Loss

see Paracusis of Willis.

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### Paradoxical Heat

A term used to denote the \*thermal illusion of heat that may arise during prolonged intense skin cooling, typically upon the return of skin temperature to a neutral level after intense cooling (for example, on moving indoors after having been outside on a cold day). Paradoxical heat is a physiological response that may be experienced by any individual. However, it may take on pathological dimensions in a number of central as well as peripheral neurological conditions such as frostbite, multiple sclerosis, and peripheral neuropathy. Various hypotheses exist regarding the neurophysiological correlates of paradoxical heat. In healthy subjects, the mediation of paradoxical heat is attributed primarily to peripheral conductance via the slow, unmyelinated C fibres, or via the faster A $\delta$  fibres. However, the established increase in the susceptibility to paradoxical heat in central neurological conditions is strongly suggestive of a central involvement. The nature of this central involvement is unknown, but empirical research would seem to suggest an involvement of the right insular cortex. Concep-

tually, the term paradoxical heat is used in opposition to \*paradoxical cold. Both phenomena are usually classified as illusions, more specifically, as \*physiological illusions or \*perceiver-distortion illusions.

#### Reference

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### Paradoxical Time Sense

see Time distortion.

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### Paraesthesia

The term paraesthesia comes from the Greek words *para* (beside, near, resembling, accessory to, beyond, apart from, abnormal) and *aísthaneisthai* (to sense). It is used to denote a somatic sensation with no apparent extracorporeal cause, usually located in or beneath the skin. It tends to be described in terms of numbness, tingling, prickling, burning, \*formication, or a sensation of ‘pins and needles’. Paraesthesia may be either transient or chronic. Transient paraesthesia may be due to conditions such as dehydration, anaesthesia, vitamin B12 deficiency, \*hypoglycaemia, hyperventilation, and panic attacks. When an arm or leg has ‘fallen asleep’ due to sustained local pressure and/or poor circulation, the term acroparaesthesia is used. Chronic paraesthesia may result from prolonged poor circulation, neuropathy, and many other conditions. Paraesthesia can also occur in the context of epileptic seizures. In a study by the French physicians François Mauguière et al. among 3,531 individuals with epilepsy, paraesthesias were found in 90% of the cases of somatosensory seizures.

#### Reference

Mauguière, F. (1999). Scope and presumed mechanisms of hallucinations in partial epileptic seizures. *Epileptic Disorders*, 1, 81–91.

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### Parageusia

Also known as parageusia. The term parageusia comes from the Greek adjective *para* (beside, near, resembling, accessory to, beyond, apart from, abnormal) and the Latin noun *gustum* (taste). It refers to the perception of foul or spoiled foods instead of a normal sense of taste. Parageusia is often associated with – and may be confused with – \*parosmia. It may also be confused with \*dysgeusia, which refers to an alteration or distortion of the sense of taste while one is eating or drinking. Etiologically, parageusia is associated primarily with diseases of the upper respiratory tract, viral influenza, general anaesthesia, iatrogenic damage of the chorda tympani, the use of illicit substances such as alcohol, opium, and amphetamines, and the use of therapeutics. The list of therapeutics associated with parageusia includes captopril, acetazolamide, allopurinol, lithium, metronidazole, flurazepam, and at least 70 other substances. In some cases, parageusia may be attributable to central disorders of the gustatory tract. Parageusia is classified as a \*gustatory illusion (i.e. a taste illusion) or as a \*chemosensory disorder.

#### References

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Schiffman, S.S., Gatlin, C.A. (1993). Clinical physiology of taste and smell. *Annual Review of Nutrition*, 13, 405–436.

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### Parageusia

see Parageusia.

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### Paranoia Hallucinatoria

The term paranoia hallucinatoria comes from the Greek noun *paranoia* (foolishness, madness) and the Latin verb *alucinari* (to wander mentally, to be absent-minded). It is used to denote a paranoid delusional state which arises as a consequence of pre-existing hallucinations. According to the German hallucinations researcher Edmund Parish (1861–1916), paranoia hallucinatoria is



typically preceded by a \*verbal hallucination. As Parish wrote in 1897, “The sufferer hears taunting or insulting voices calling after him in the street, and making injurious insinuations about him, or sometimes unseen speakers incidentally let fall words which confirm his forebodings. In the later stages of the disease also auditory hallucinations predominate, and may be extremely vivid and distinct, although they also occur as soundless inner voices.” The Russian psychiatrist Victor Kandinsky (1849–1889), who had first-hand experience at once as a psychiatrist and a psychiatric patient, diagnosed himself with paranoia hallucinatoria. In the classic psychiatric literature, paranoia hallucinatoria is designated by a variety of terms, such as paranoia hallucinatoria acuta (Georg Theodor Ziehen (1862–1950)), amentia (Theodor Meynert (1833–1898)), hallucinatory insanity (Carl Fürster (1848–1906)), acute hallucinatory insanity (Richard Freiherr von Krafft-Ebing (1840–1902)), and \*hallucinosis (Carl Wernicke (1848–1905)).

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- Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

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### Para-optic Perception

Also known as paroptic sight, \*eyeless vision, eyeless sight, finger vision, dermo-optics, dermo-optical perception, dermal vision, skin reading, skin vision, cutaneous perception, digital sight, and bio-introscopy. The term para-optic perception is indebted to the Greek words *para* (beside, near, resembling, accessory to, beyond, apart from, abnormal) and *opsis* (seeing). The term *perception paraoptique* was introduced in or shortly before 1920 by the French author Louis Farigoule (1885–1972), better known under the pen name Jules Romain, to denote the capacity to perceive colours and formed images through the skin, especially upon touching with the fingertips. Instances of para-optic perception have been reported since the era of mesmerism. During the 1960s, this allegedly paranormal phenomenon became an object of study in the Soviet Union and several other countries. In biomedicine, para-

optic perception is either associated with hysteria or identified as a type of \*synaesthesia. In either case, the visual percepts in question are interpreted as \*visual hallucinations that arise simultaneously with – or in close succession to – a tactile stimulus.

#### References

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### Paraosmia

see Parosmia.

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### Paraschematia

The term paraschematia comes from the Greek words *para* (beside, near, resembling, accessory to, beyond, apart from, abnormal) and *schéma* (form, scheme, topographic map). It translates roughly as ‘inadequate mapping of space’. The term *paraschématie* was introduced in or shortly before 1905 by the French neurologist Pierre Bonnier (1861–1918) to denote a variant of \*aschematia characterized by an inadequate representation of the space occupied by certain body parts. Pathophysiologically, paraschematia is associated with lesions affecting the right parietal lobe. Because of its subjective nature, it cannot be observed directly in affected individuals. It can be inferred, however, from drawings in which the affected individual displays an inadequacy of spatial representations. Paraschematia is considered a productive and subconscious manifestation of neglect. It is usually classified as a variant of the \*body schema illusion. The term paraschematia is used in opposition to the terms \*hyperschematia and \*hyposchematia.

#### Reference

- Bonnier, P. (1905). L'aschématie. *Revue Neurologique*, 13, 605–609.

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## Paraselene

see Halo.

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## Parasitic Memory Hypothesis

A hypothesis involving the role of spurious memory traces in the mediation of \*musical hallucinations. The term parasitic memory was introduced in or shortly before 1983 by the British neuroscientists Francis Harry Compton Crick (1916–2004) and Graeme Mitchison (b. 1944). These authors use the term in the context of their reverse-learning dream–sleep hypothesis, which involves the notion that certain undesirable connections in cerebral cortical networks are removed by a reverse learning mechanism during REM sleep. This reverse learning mechanism is conceptualized as a neural mechanism by means of which memory traces are weakened rather than strengthened during \*dream activity. As Crick and Mitchison recapitulate, “We dream in order to forget.” Thus the notion of the parasitic memory was introduced to denote an apparently ‘useless’ memory trace which is accidentally consolidated rather than weakened. The notion of the parasitic memory was taken up in 1992 by the American psychiatrists Matcheri S. Keshavan et al. as one of a series of explanatory models for the mediation of musical hallucinations. Starting from the observation that musical hallucinations tend to consist of tunes perceived in the past, Keshavan et al. argue that “a musical memory, with its particular propensity to arouse affect, involving widely distributed brain regions, may prove resistant to unlearning.” As they conclude, “This may resonate in a neural net producing the experience of a hallucination. The conditions necessary to set such a chain of events in motion remain unclear, but perhaps sensory deprivation and cerebral dysfunction play a role.” On the basis of the authors’ account, it would seem justified to classify the parasitic memory hypothesis of musical hallucinations as a variant of the \*reperception model of hallucinations.

## References

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## Pareidolia

Also known as pareidolic illusion, partial hallucination, and ‘additional image perception’ (German: *Nebenbildwahrnehmung*). The term pareidolia comes from the Greek words *para* (beside, near, resembling, accessory to, beyond, apart from, abnormal) and *eidōs* (image, appearance, looks). The terms *Pareidolie* and *Nebenbildwahrnehmung* were introduced in or shortly before 1885 by the Russian psychiatrist Victor Kandinsky (1849–1889) to denote a partial \*visual hallucination in which a person’s face is literally and consistently perceived as someone else’s (as in the \*intermetamorphosis syndrome), or where a given object is perceived as a different object. Some common examples of pareidolia are the perception of a face or animal’s head in a patterned background such as a wallpaper motif, a cloud, a stain on the wall, or a curtain. One well-known pareidolia was reported in 1978 by a New Mexican woman, who had discerned the face of Jesus Christ in the burn marks of a tortilla, and had subsequently put it on display for visitors, who came in their thousands to share in the experience. Because of the presence of an actual pattern in the extracorporeal world, pareidolia may be classified as a \*cognitive illusion. Kandinsky himself, however, argues that it occupies a sort of middle ground – or perhaps one should say a common ground – between the hallucination and the illusion. As he explains, “This type of illusion... is... basically also a hallucination, distinguishing itself from the more regular hallucination only because the inner impulse, the inner anomaly is not sufficient for its occurrence, and that a certain exterior impulse must be added, so that the hallucination is not a complete one, but only a partial one.” Today the occurrence of pareidolia tends to be attributed to \*apophenia, i.e. an excess of perceptual or heuristic sensitivity leading to the discernment of patterns or connections in random or otherwise meaningless data. Following the latter approach, advocated by the German neurologist and psychiatrist Klaus Conrad (1905–1961), the notion of pareidolia has a bearing on an even wider range of illusory phenomena, including the discernment of religious

imagery and themes (such as the face of Jesus, or the word Jesus) in random visual patterns, and the discernment of meaningful auditory messages in musical lyrics played backwards. The latter type of pareidolia is referred to as \*auditory pareidolia. In association tests such as the Rorschach inkblot test, pareidolia is used deliberately as a diagnostic tool for the assessment of affect-laden preoccupations and other mental characteristics.

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## Pareidolic Illusion

see Pareidolia.

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## Parhelion

see Halo.

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## Parish's Definition of Hallucinations

In 1894, the German hallucinations researcher Edmund Parish von Senftenberg (1861–1916) defined hallucinations as follows: "A hallucination is... a sense-perception like any other, 'only there happens to be no object there, that is the whole difference'." The passage between single quotation marks constitutes a reference to the definition of hallucinations as issued by the American psychologist and philosopher William James (1842–1910).

### References

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- Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

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## Parkinson's Disease and Hallucinations

The eponym Parkinson's disease refers to the British physician James Parkinson (1755–1824), who has been credited with being the first to describe the concomitant disease in 1817. The eponym itself was coined during the 1870s by the French neurologist Jean Martin Charcot (1825–1893). Parkinson's disease is primarily classified as a movement disorder, or, more specifically, as a disorder of the extrapyramidal system. It is characterized by a variety of motor signs, including tremor (usually at rest), a stooped posture, impaired postural reflexes, rigidity, a mask-like facies, a reduced blink rate, apraxia, akathisia, dyskinesia, and bradykinesia or even akinesia. It may be accompanied by a variety of non-motor complications such as depression, paranoia, delusions, \*delirium, hallucinations, impaired colour vision and contrast discrimination, cognitive disturbances, sleep–wake cycle disturbances, and speech disorders. These symptoms may also occur in the context of parkinsonism, a syndrome with similar features that is not necessarily due to idiopathic Parkinson's disease. As to its pathophysiology, Parkinson's disease is attributed primarily to impaired functioning of the motor cortex, which is in turn attributed to the insufficient production and action of dopamine within the basal ganglia. In outpatient populations of individuals suffering from Parkinson's disease, hallucinations have been reported in up to 25% of cases. The lifetime prevalence of hallucinations has been estimated at around 46%. Most of these hallucinations are visual in nature. They typically consist of \*complex hallucinations depicting persons, humanoid figures, animals (i.e. \*zoopsia), or objects. Hallucinations occurring in the context of Parkinson's disease can also be \*compound in nature, combining visual and auditory elements in the majority of these cases. Isolated auditory hallucinations and \*simple hallucinations are rarely reported. Tactile hallucinations are even less prevalent. If present, they tend to

be long lasting and to coincide with the visual hallucinations. In addition, Parkinson's disease may be complicated by \*illusions and so-called \*minor hallucinations such as \*sensed presence and \*passage hallucinations. It has been suggested that the relatively low prevalence of simple hallucinations in Parkinson's disease is due to underreporting. Etiologically, hallucinations and illusions in Parkinson's disease are sometimes attributed to the disease itself. However, the majority of these perceptual symptoms are attributed to the dopatherapy that is often prescribed, even though a dose-related effect has never been established. The mediation of hallucinations and illusions in Parkinson's disease can probably be best explained by reference to a multi-factorial model that takes into account the various pharmacological agents involved, disturbances of the circadian rhythm, and cognitive impairment, as well as the influence of comorbid disorders such as dementia and ocular disease.

#### References

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### Paroptic Vision

see Eyeless vision.

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### Parosmia

Also known as paraosmia and dysosmia. The term parosmia comes from the Greek words *para* (beside, near, resembling, accessory to, beyond, apart from, abnormal) and *osmè* (smell, stink, fragrant, odour, scent, perfume). It translates loosely as a 'false smell'. The term parosmia is used to denote an erroneous olfactory response to an existing odour, i.e. an \*illusion in the olfactory modality. When odours arise in the absence of an external olfactory stimulus, they are referred to as \*phantosmia or \*olfactory hallucination. Parosmia tends to present in the form of a foul odour such as that of burning flesh, faeces, garlic, rotting fish, rotting eggs, vomit, garbage, or 'neglected

laundry'. Such foul odours are also referred to as \*cacosmia. Parosmia may be attributable to peripheral as well as central conditions. Peripheral causes of parosmia include rhinitis, sinusitis, and other upper respiratory tract diseases, as well as chronic cocaine abuse. Central conditions include lesions or processes affecting the olfactory system, \*migraine aura, and temporal lobe epilepsy. Parosmia is classified as an \*olfactory illusion (i.e. a smell illusion) or as a chemosensory disorder.

#### References

- Ackerman, B.H., Kasbekar, N. (1997). Disturbances of taste and smell induced by drugs. *Pharmacotherapy*, 17, 482–496.
- Mauguière, F. (1999). Scope and presumed mechanisms of hallucinations in partial epileptic seizures. *Epileptic Disorders*, 1, 81–91.
- Schiffman, S.S., Gatlin, C.A. (1993). Clinical physiology of taste and smell. *Annual Review of Nutrition*, 13, 405–436.

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### Pareidolia

see Narcolepsy and hallucinations.

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### Partial Hallucination

see Pareidolia.

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### Partial Macrosomatognosia

A term used to denote a type of \*macrosomatognosia in which one or more body parts are experienced as disproportionately large. The term is used in opposition to \*whole-body macrosomatognosia and \*total body macrosomatognosia.

#### Reference

- Podoll, K., Robinson, D. (2000). Macrosomatognosia and microsomatognosia in migraine art. *Acta Neurologica Scandinavica*, 101, 413–416.

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## Partial Microsomatognosia

A term used to denote a type of \*microsomatognosia in which one or more body parts are experienced as disproportionately small. The term is used in opposition to \*whole-body microsomatognosia and \*total body microsomatognosia.

### Reference

Podoll, K., Robinson, D. (2000). Macrosomatognosia and microsomatognosia in migraine art. *Acta Neurologica Scandinavica*, 101, 413–416.

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## Pascal, Blaise (1623–1662)

A French poet, mathematician, natural philosopher, and mystic who suffered from recurring headaches, vertigo, and episodes of partial paresis of the limbs, as well as from visual disturbances which have traditionally been labelled as \*visual hallucinations. Following a near-death experience on the bridge of Neuilly in Paris, where his carriage almost tumbled into the river, Pascal would frequently refer to an abyss opening up at the left side of his body, meanwhile grabbing a chair or holding on to a stick for safety. Although this experience is often referred to as hallucinatory in nature, it is unclear what Pascal actually saw at these moments, or even whether he saw anything at all. The French psychologist Louis-François Lélut (1804–1877) collected and summarized the various contemporary testimonies of Pascal's experience in his seminal 1846 monograph, but even his verdict is inconclusive. In 1966 the British neurologist Macdonald Critchley (1900–1997) suggested that “this recurring precipice was actually a transitory left hemianopia”. Following Critchley's suggestion, Pascal's ‘abyss’ may well have been a \*scotoma occurring in the context of migraine with or without headache.

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Scholtens, M. (1958). *Études medico-psychologiques sur Pascal*. Thesis, University of Utrecht. Haarlem: Joh. Enschedé en Zonen.

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## Passage Hallucination

A term used to denote a transient \*visual hallucination consisting of persons or animals that pass sideways out of the visual field. In a study by the French neurologists Gilles Fénelon et al. among individuals suffering from Parkinson's disease, passage hallucinations tended to last for a few seconds up to 5 min. They are sometimes classified as so-called \*minor hallucinations. Etiologically, they are associated with a variety of psychiatric, ophthalmologic, and neurological conditions, including \*muscae volitantes, narcolepsy, parkinsonism, Parkinson's disease, and the use of \*hallucinogens such as mescaline and LSD.

### Reference

Fénelon, G., Mahieux, F., Huon, R., Ziegler, M. (2000). Hallucinations in Parkinson's disease: Prevalence, phenomenology and risk factors. *Brain*, 123, 733–745.

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## Passive Illusion

Also known as \*assimilative illusion. The term passive illusion was introduced in or shortly before 1881 by the British psychologist James Sully (1842–1923) to denote a variant of what he called illusions of interpretation (i.e. what are now called \*cognitive illusions). In Sully's reading, passive illusions arise as a consequence of the false interpretation of a correctly perceived stimulus deriving from the extracorporeal environment, due to an inherent property of the object or stimulus in question. As he maintains, “For example, we fall into the illusion of hearing two voices when our shout is echoed back,

just because the second auditory impression irresistibly calls up the image of a second shouter.” Sully uses the term passive illusion in opposition to the term \*active illusion. He illustrates the latter type of cognitive illusion by means of the following example: “A man experiences the illusion of seeing specters of familiar objects just after exciting his imagination over a ghost-story, because the mind is strongly predisposed to frame this kind of percept.” As he concludes, “the first class of illusions arises from without, the sense-impression being the starting-point, and the process of preperception being controlled by this. The second class arises rather from within, from an independent or spontaneous activity of the imagination. In the one case the mind is comparatively passive; in the other it is active, energetically reacting on the impression, and impatiently anticipating the result of the normal process of preperception. Hence I shall, for brevity’s sake, commonly speak of them as Passive and Active Illusions.”

#### Reference

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### Pathological Hallucination

The term *hallucination pathologique* was used by the French alienist Alexandre Jacques François Brierre de Boismont (1797–1881) to denote a hallucination associated with a “troubled reason”. As he wrote, “*Pathological hallucination*... has its origin in diverse causes and mostly false ones; it is almost always associated with delirious conceptions. It invokes most erroneous and contradictory motives. Almost always it is impregnated with childish terrors, or is based on ridiculous exaggerations. It presents remarkable transformations. After time, it causes confusion of ideas and enfeeblement of reason.” Brierre de Boismont distinguishes pathological hallucinations from \*physiological hallucinations. As he asserts, “Their different character depends on whether the reason is intact or troubled.” His notion of pathological hallucination would seem to resemble the notion of \*delirious hallucination as used by the French psychiatrist Henri Ey (1900–1977).

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### Pattern-Induced Flicker Colours

see Benham’s top.

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### PCP and Hallucinations

see Phencyclidine-induced hallucination.

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### Peduncular Hallucination

Also known as peduncular hallucinosis, pedunculo-pontine hallucinosis, Lhermitte’s hallucinosis, Lhermitte syndrome, \*brainstem hallucination, and \*mesencephalic hallucinosis. The eponyms Lhermitte’s hallucinosis and Lhermitte syndrome refer to the French psychiatrist Jean-Jacques Lhermitte (1877–1959), who is credited with being the first to describe the concomitant phenomenon in 1922. The eponym Lhermitte syndrome was introduced in or shortly before 1936 by the Swiss neurologist Georges de Morsier (1894–1982). The term peduncular hallucination is indebted to the Latin noun *pedunculus*, which means stalk or stem. It refers to a stalk-like connecting structure in the upper brainstem called the *pedunculus cerebri*. The term peduncular hallucination and its synonyms are used to denote a vivid type of hallucination, often \*visual or \*compound in nature, the mediation of which is attributed to aberrant neuronal discharges in or around the rostral brainstem. The term peduncular hallucination was introduced in or shortly before 1924 by the Belgian neuropathologist Ludo van Bogaert (1897–1989). In 1922, Lhermitte had published a paper on dreamlike perceptual phenomena occurring in waking subjects suffering from rostral brainstem pathology. In 1924 and 1927, van Bogaert described a series

of similar cases to which he gave the name peduncular hallucination. Peduncular hallucinations have historically been envisaged as complex, lively, and often brightly coloured visual hallucinations which may last for seconds to several hours. They often consist of people (typically but not always described as walking in file), faces (i.e. \*facial hallucinations), animals (i.e. \*zoopsia), and landscapes. The hallucinations in question can be realistic, distorted, or fantastic in nature, and appear in a regular or a miniature format (i.e. \*microptic hallucinations). Pathophysiologically, they are believed to occur as a consequence of lesions or functional aberrations within the pedunculus cerebri (previously designated as the brain's dream centre), the midbrain, pons, or diencephalon. More specifically, they are believed to correlate with a dysfunction of the third nerve nucleus, the red nucleus, the superior colliculus, the periaqueductal grey matter, the substantia nigra, and the pulvinar. Some authors suggest that peduncular hallucinations are typically accompanied by a sleep disturbance, whereas others attribute them exclusively to the neuroanatomical lesions themselves. De Morsier has been credited with expanding the scope of the notion of peduncular hallucination to include hallucinatory percepts attributed to thalamic lesions. Etiologically, peduncular hallucinations are associated with any type of pathology capable of affecting said structures, including infectious disease, vascular disease, vascular malformations, and neoplasms. They have also been reported in the context of paroxysmal neurological disorders such as migraine and epilepsy, in individuals with a clinical diagnosis of \*schizophrenia or dementia, in multiple sclerosis, in the context of traumatic brain lesions, as a consequence of iatrogenic lesions caused by regional surgery or angiography, and as side effects of dopaminergic and anticholinergic medication. A type of hallucination considered closely akin to the peduncular hallucination (i.e. in a conceptual and pathophysiological sense) is known as \*brainstem auditory hallucinosis. In addition, a relationship has been suggested with visual hallucinations occurring in the context of \*Charles Bonnet syndrome, and with the groups of \*lilliputian and \*gulliverian hallucinations (i.e. visual or compound hallucinations depicting people or animals of a disproportionately small or large size). Because of its emphasis on the involvement of a specific brain structure (i.e. the pedunculus cerebri or one of its surrounding midbrain structures),

the peduncular hallucinosi model may be classified as a \*topological model of hallucinatory activity.

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## Peduncular Hallucinosi

see Peduncular hallucination.

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## Pedunculopontine Hallucinosi

see Peduncular hallucination.

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## Pelopsia

The term pelopsia comes from the Greek words *pelōrios* (peculiarly large) and *opsis* (seeing). It is used to denote a visual distortion in which stationary objects appear to be closer than they are. Pelopsia is classified either as a \*metamorphopsia or as a \*dysmetropsia. The term is used in opposition to \*telopsia. Pelopsia should not be confused with \*macropsia, in which objects are perceived as disproportionately large, but not necessarily as closer by.

### Reference

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### Penicillin Psychosis

see Hoigné syndrome.

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### Perceiver-Distortion Illusion

see Physiological illusion.

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### Perception and Attention Deficit Model (PAD Model)

A hypothetical model for the mediation of \*complex visual hallucinations, proposed in or shortly before 2004 by the British scientists Daniel Collerton, Elaine Perry, and Ian McKeith. The PAD model is based on the observation that complex visual hallucinations are \*perceptive hallucinations, i.e. that they consist of hallucinated objects or scenes which appear to be integrated into the hallucinator's extracorporeal environment. To explain this state of affairs, Collerton et al. point to a combination of impaired attentional binding, poor sensory activation of a correct proto-object, and a relatively intact ability to create a scene representation. They suggest that these three factors are prerequisites for the mediation of a hallucinatory image, as well as for its fusion with a regular sense perception. According to these authors, the neurobiological correlates of this process may well consist of disturbances – possibly of a cholinergic nature – in the neuronal system connecting the lateral frontal cortex and the ventral visual stream.

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### Perceptive Hallucination

Also known as hallucination of perception. Both are classic terms used to denote a hallucination that is embedded in sense impressions from the external environment. Near the end of the 19th

century, perceptive hallucinations were thought to arise from a process in which memories were first shunted back to the senses via efferent nerve fibres, and then forward via afferent ones to the cerebral sensory cortex, together with sensory information. The German chemist Ludwig Staudenmaier (1865–1933) suggested that in this way the sense organs facilitate the 'outward projection' or 'physical projection' of perceptual information into extracorporeal space. The Italian psychiatrist Eugenio Tanzi (1856–1934) was one of the first to describe this mechanism, referring to it as the \*reversed conductivity of the sensory pathways. A contemporary hypothetical model that seeks to explain the mediation of perceptive hallucinations is the \*perception and attention deficit model (PAD model).

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### Perceptual Aftereffect

see Aftereffect.

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### Perceptual Distortion

see Sensory distortion.

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### Perceptual Disturbance

Also known as \*disorder of perception. Both these umbrella terms are used to denote an aberrant perceptual phenomenon occurring to the waking mind. In *Fish's Clinical Psychopathology*, the group of perceptual disturbances is divided into \*sensory deceptions (comprising hallucinations and \*illusions) and \*sensory distortions



(involving changes in the intensity, quality, or spatial form of sense perceptions).

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## Perceptual Illusion

see Cognitive illusion.

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## Perceptual Lag Phenomenon

A term introduced in or shortly before 1956 by the Canadian psychologists Woodburn Heron et al. to denote an apparent reduction in the speed of moving objects, induced by \*sensory deprivation. Heron et al. illustrate this phenomenon by describing the S-shaped appearance of a straight, rotating line. This S-shaped appearance is attributed to perceptual lag, in the sense that the ends of the line appear to lag behind the central part. A reduction of up to 40% in the apparent speed of moving lines was reported in numerous studies that followed in the wake of this initial finding. The perceptual lag phenomenon is usually classified as a \*physiological illusion. A variant in which the apparent speed of a visual stimulus is influenced by sounds is known as temporal ventriloquism.

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## Perceptual Minification

see Minification.

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## Perceptual Release Theory of Hallucinations

Also referred to as dream intrusion, \*dual-input model, and seepage theory. The term perceptual release theory was introduced in or shortly before 1958 by the American psychiatrist Louis Jolyon West (1924–1999) to denote a hypothetical model for the mediation of hallucinations that proceeds on the assumption that the 'lower' parts of the brain are capable of producing endogenous percepts, and that these can be 'released' (or made to 'seep through') towards the 'higher' (i.e. cortical) centres, thus giving rise to a \*release hallucination. The model suggests that sense perceptions and other life experiences leave permanent neural templates or engrams in the brain, which are continually competing with externally generated percepts for the individual's attention. The 19th-century dream researcher Louis-Ferdinand-Alfred Maury (1817–1892) referred to this continuous stream of endogenous percepts as an \*oneiroid, or dreamlike, activity (hence the term dream intrusion). Maury also suggested that during normal wakefulness we are barely aware of this activity because it tends to be inhibited, or kept out of our awareness, by the constant stream of sense perceptions. Hypotheses like West's and Maury's have their roots in the darwinian notion, voiced by the British neurologist John Hughlings Jackson (1835–1911), that the brain's morphological structure reflects the successive stages of evolutionary development, with the 'lower' parts being phylogenetically older and the 'higher' parts being of a more recent evolutionary date. Since hallucinations are traditionally considered more primitive in nature than sense perceptions, their origin has been sought in the lower levels of the brain, i.e. the least organized and least complex regions, but the ones considered 'fittest for survival' under unfavourable conditions. In 1884, Jackson hypothesized that the loss of 'higher' cerebral functions might be brought about by a retrograde evolutionary process called dissolution. The concomitant doctrine, known as \*Jackson's law, states that a loss of mental functions due to disease retraces in reverse order the evolutionary development of the brain. This loss of normal functioning was referred to by Jackson as 'negative' symptomatology and the release of cognitive and/or perceptual phenomena from the brain's more

'primitive' centres as 'positive' symptomatology. As a corollary, he argued that positive symptoms (such as hallucinations) might well originate from the *normal* activity of the brain's 'lower' centres. Throughout the 20th century, Jackson's law proved an important source of inspiration for hallucinations researchers. During the 1920s, for example, it was taken up by the French psychiatrist Jean-Jacques Lhermitte (1877–1959) to furnish his model of \*peduncular hallucinosis. During the 1960s, West's perceptual release theory was further refined under the influence of \*sensory deprivation experiments and the study of \*drug-induced hallucinations. Variants of West's perceptual release theory include the \*experiential projector model formulated by the American psychopharmacologists Ronald K. Siegel and Murray E. Jarvik, and the \*dual-input model formulated by the American psychiatrist Jacob A. Arlow (1912–2004).

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### Perceptual Synaesthesia

The term perceptual synaesthesia comes from the Latin noun *percipere* (to receive, to perceive, to comprehend) and the Greek words *sun* (together, unified) and *aisthanesthai* (to notice, to perceive). The concept was introduced in or shortly before 1954 by the Hungarian-Dutch experimental psychologist Géza Révész (1878–1955) to denote what is known simply as \*synaesthesia. In other words, the term perceptual synaesthesia is used to denote a hallucinated secondary percept which is triggered by a sense perception experienced in a different sensory modality. A common example is \*colour hearing, in which a specific hallucinated colour, such as a patch of yellow, is triggered by a specific auditory percept, such as the sound of a trumpet. Révész called this a *perceptual* synaesthesia in order to distinguish it from two additional types of synaesthesia, called \*conceptual

synaesthesia (in which the secondary 'percept' is not an actual percept, but an ideated sensation without perceptual qualities) and \*mental synaesthesia (in which the secondary percept is triggered by its name).

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### Perceptualization of the Concept

Perceptualization of the concept is the name of a hypothetical model for the mediation of hallucinations which utilizes the general idea that hallucinations are transformations of thoughts. The French psychologist Louis-François Lélut (1804–1877) has been credited with prelude on this model when he wrote that "the hallucination is the transformation of a thought into a sensation." The Italian-American psychiatrist Silvano Arieti (1914–1981), whose work focuses on the non-biological etiology of \*schizophrenia, wrote about perceptualization of the concept: "In the light of our general interpretation of the schizophrenic process, it is not difficult to understand hallucinations. They were originally thoughts or images that have changed into perceptions. The level of perception is phylogenetically and ontogenetically lower than the levels of verbal thought, and lower even than the level of images. Images, stored in our memory, may be used by hallucinations, but they are reproduced with the modalities of perception... It seems useless, therefore, to continue to argue whether hallucinations are intensified images or perceptions. They are mental processes, usually occurring at higher levels of integration, which use some of the mechanisms of perceptions, although they do not originate from the peripheral sense organs." Today the notion of perceptualization of the concept is rarely used, although the process to which it refers features in various explanatory models of hallucinatory activity, notably the \*inner speech model of verbal auditory hallucinations.

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### Perceval, John Thomas (1803–1876)

A British aristocrat, son of Prime Minister Spencer Perceval (1762–1812), and self-proclaimed 'attorney-general of all Her Majesty's madmen'. Perceval lost his father at the age of 9. In 1830 he resigned his commission in the Grenadier Guards, spent some time at Oxford University, travelled to Dublin, became psychotic, and was incarcerated from 1831 through 1834. He suffered from a \*psychosis with \*auditory hallucinations, catatonic features, and religious delusions involving the second coming of Christ, described with meticulous precision in an autobiographical narrative which was published in 1838. As recounted by Perceval, he experienced "audible and articulate voices" (i.e. \*verbal auditory hallucinations) which he attributed to "the spirit" or "the Holy Spirit". Some of the messages thus received were revelatory in nature, whereas others consisted of \*command hallucinations which urged him to make confessions, to assume certain positions, to lie face-down on the floor, etc. The numerous psychotic symptoms experienced by Perceval included \*visual verbal hallucinations, automatic writing, onomatomania, mutism, anosmia (i.e. the inability to smell), and \*kalopsia, in the sense that he perceived all things in his environment as "so beautiful and so lovely... that I do not know how to behave myself to any thing about me as I should do, in a reasonable manner." His delusions led him to have resort to dangerous behaviour. For instance, in an attempt to rid himself of demons, he would throw himself on the back of the head, fearful of breaking his neck, but accepting this as a risk worth taking. In the asylum he displayed physically violent and uncontrollable behaviour, which was dealt with by means of straightjackets, forced treatments, cold baths, and many other measures which he described as veritable horrors. Perceval's autobiographical narrative was written as a vehement charge against the treatment of psychiatric patients by asylum physicians in 19th-century England and France. After his discharge, Perceval campaigned for the rest of his life to improve the rights of psychiatric patients.

His influence as a mental health reformer was unprecedented, and it has had a lasting impact on European psychiatry. The import of his work for hallucinations research lies in the combination of a first-hand acquaintance with hallucinatory phenomena and an exceptional talent for verbalizing and analysing them. This combination places him in a league with other hallucinating intellectuals, such as Daniel Paul Schreber (1842–1911), Victor Kandinsky (1849–1889), Christoph Friedrich Nicolai (1733–1811), Vaslav Nijinsky (1889–1950), Guy de Maupassant (1850–1893), Fjodor Dostoevsky (1821–1881), and Ludwig Staudenmaier (1865–1933).

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### Peripheral Tinnitus

see Otic tinnitus.

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### Perky Effect

see Perky phenomenon.

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### Perky Phenomenon

Also known as Perky effect. Both eponyms refer to the American psychologist Cheves West Perky (1874–1940). They refer to the phenomenon of mistaking a sensory percept for a product of the imagination. The phenomenon was first reported by Perky in 1910, after she had subjected a group of trained introspectionists to a test in which they were requested to look at a blank screen and to imagine as vividly as possible an object such as

a tomato or a banana. Without their knowledge, these objects were subsequently back-projected onto the screen. The introspectionists dismissed the images as products of their imagination. Because the images were actually perceived, but misinterpreted as imaginary in nature, the phenomenon does not count as a \*negative hallucination.

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### Perseveration

see Visual perseveration.

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### Perseverative Somaesthetic Sensation

see Tactile polyaesthesia.

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### Persistent Aura Without Infarction

A term used to denote a rare complication of migraine with aura, consisting of persistent \*simple or \*geometric visual hallucinations such as \*visual snow, lasting for months or years, without any evidence of cerebral infarction.

### Reference

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### Persistent Genital Arousal Disorder (PGAD)

see Persistent sexual arousal syndrome (PSAS).

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### Persistent Sexual Arousal Syndrome (PSAS)

Also known as persistent genital arousal disorder (PGAD). The acronym PSAS was introduced in or shortly before 2001 by the American sexologist Sandra Leiblum to denote a persistent feeling of genital arousal in women which may last for days to weeks. Phenomenologically, the condition may be characterized as a protracted \*sexual hallucination or the continuous feeling of being on the verge of an orgasm. It has nothing to do with hyperarousal or hypersexuality. Conceptually, PSAS constitutes the logical counterpart of sexual arousal disorder, a condition in which the ability to develop or maintain sexual arousal is diminished. PSAS would seem to occur only in women, mostly between ages 40 and 65. Its prevalence would seem to be extremely low, although it is suspected that it may be underreported. The etiology and pathophysiology of PSAS are basically unknown. In a few cases, it appears to be attributable to the use of trazodone or other drugs. Occasionally, it is attributable to somatic conditions such as a pelvic arterio-venous malformation.

### Reference

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### Persistent Hallucinosi

A term used somewhat loosely to denote a hallucinatory state with a protracted or permanent character.

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## Personification

The term personification comes from the Latin words *persona* (mask, person) and *facere* (to make). It is used to denote a \*compound hallucination depicting a human being. Karl Jaspers (1883–1969) credits the German chemist Ludwig Staudenmaier (1865–1933) with introducing the term in 1912. Staudenmaier, who after an experimental phase in occultism had been diagnosed with \*schizophrenia, uses the term to denote an ‘outwardly projected’ hallucinatory human figure. In conformity with the ideas of the Italian psychiatrist Eugenio Tanzi (1856–1934) on the \*reversed conductivity of the primary sensory pathways, Staudenmaier suggests that centrally mediated perceptual information may be conducted efferently along the primary sensory pathways, thus allowing the sense organs to engage in the ‘outward projection’ or ‘physical projection’ of that information into extracorporeal space. Having experienced hallucinations in the form of personification himself during episodes of automatic writing, he wrote that “single hallucinations gradually emerged more definitely and returned more often. At last they formed into *personifications*; for instance, the more important visual images regularly combined with the corresponding auditory images, so that the emerging figures began to speak to me, gave me advice and criticised my actions.” Staudenmaier interpreted these hallucinations in Freudian fashion as “emancipated parts of the unconscious”. Proceeding on the dictum that whatever is able to receive must also be able to send, he wished to provide humanity with the tools necessary to produce ‘physicalizations’. It has been claimed by the American-Canadian neuropsychologist Michael A. Persinger (b. 1945) that personifications can be evoked experimentally with the aid of a \*Koren helmet. A different use of the term personification can be found in the work of the British neurologist Macdonald Critchley (1900–1997). In 1955, Critchley introduced the term to denote the investment of a paretic limb with a personality or an identity of its own, such as may occur in hemiplegia due to lesions to the parietal lobe. As Critchley wrote, “The patient invests the limb with a sort of personality of its own and speaks

of it as ‘she’ or ‘he’. More often a nickname is used: ‘old useless’, ‘the delinquent’, ‘George’, ‘the old immovable’, ‘Gammy’, ‘floppy Joe’, ‘the nuisance’, ‘Fanny’, ‘Mary Ann’, ‘Silly Jimmy’, ‘Toby’, ‘the pet’, ‘Dolly Gray’, ‘the bugger’. Personification and misoplegia are at times coexistent. A patient with a right cerebral softening spoke of his paralyzed arm as ‘the old swine’ or ‘the stinker,’ and went on to say, ‘Don’t talk about its twitching, or it might hear you, and start again!’” Neither variant of personification should be confused with \*ordinal-linguistic personification, which is a type of \*synaesthesia.

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## Personification Anosognosia

see Somatoparaphrenia.

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## Peyote and Hallucinations

see Mescaline and hallucinations.

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## Phanerothyme

see Psychedelic.

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## Phantasm

see Phantasma.

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## Phantasma

Also known as phantasm. The Greek noun *phantasma* means ghost or spectre. During the era of

classic psychiatry, it had a variety of meanings and connotations. Thus it was used in 1826 by the German physiologist and zoologist Johannes Peter Müller (1801–1858) to denote the type of \*complex visual hallucination now known as a \*hypnagogic hallucination. As Müller recounts, he himself had experienced such phantasmata from childhood onwards. With closed eyes, especially in a dark environment, he was able to see colourful, three-dimensional scenes of persons, animals, landscapes, etc., as well as a gradual ‘dawning’ of the darkness in their background. As he explained, he was able to conjure up these hallucinations at will and to enjoy their continuously changing shapes for hours on end, at least as long as he was rested, and not preoccupied with other matters. And yet he noted that the content of these phantasms was beyond his conscious control. Without their being preceded by specks of light or other visual sensations that might act as a \**point de repère* and without reacting to any conscious efforts at steering in this or that direction, the phantasmata would appear spontaneously and display complex images which he was sure he had never seen before. In Müller’s own words: “I sit there for quite a while with eyes closed; everything that I imagine is just imagination, imagined delineation within the dark visual field, without shining, without moving organically within the field of vision, when suddenly the moment of sympathy sets in between the fantastic and the light nerves, all of a sudden shining figures appear, without any effort of the imagination.” According to Müller, phantasmata are quite common. Rather than relegating them to the class of \*dreams or products of the imagination, he classifies them as actual perceptual phenomena attributable to the physiological workings of the perceptual system. In an era predating the functional and conceptual association of visual perception and the occipital cortex, Müller attributed their mediation to the *Sehsinnssubstanz* (i.e. ‘substance of vision’) located by him within the eye, and/or the cerebral structures connected to it, which he held responsible for mediating waking images as well as dream images. Müller also uses the term *phantasma* to denote a similarly complex type of hallucination experienced in the auditory modality. The German psychiatrist Karl Ludwig Kahlbaum (1828–1899) used the term *phantasma* to denote a hallucination of the \*centrifugal type. His compatriot Hermann Emminghaus (1845–1904) used it as an umbrella term for hallucina-

tions and \*illusions, while another compatriot, Georg Theodor Ziehen (1862–1950), used it to denote a hallucination that lacks the vividness of an ordinary sense perception.

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## Phantasmagoria

The term phantasmagoria is indebted to the Greek noun *phantasma* (ghost, spectre). It is used primarily to denote a shifting series of illusions or dream images occurring in \*dreams, \*daydreams, and fantasies, but it is also used as a synonym for ‘trip’ (as in \*LSD trip). The origin of the term has been variously attributed to the Belgian physicist Étienne-Gaspard Robert (1764–1837), also known as Etienne Robertson, and the German or Flemish magician Paul Philidor, also known as Paul M. de Philipstahl, who ran a magic lantern show entitled *Phantasmagoria* in Western Europe around 1800. An alternative meaning of the term phantasmagoria is the raising or perceiving of spirits of the dead. As noted in 1883 by the British scientist Sir Francis Galton (1822–1911), “A common form of vision is a phantasmagoria, or the appearance of a crowd of phantoms, sometimes hurrying past like men in a street. It is occasionally seen in broad daylight, much more often in the dark; it may be at the instant of putting out the candle, but it generally comes on when the person is in bed, preparing to sleep, but by no means yet asleep.” The latter passage would seem to suggest a conceptual and phenomenological kinship with \*hypnagogic hallucinations, also known as \*faces in the dark.

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## Phantasos

In Greek mythology, Phantasos is one of the gods of \*dreams, more specifically, the god of dreams involving inanimate objects. He was known as a brother (or son, in an alternative version) of Hypnos, the god of sleep. Being one of the \*Oneiroi, he was considered a ruler of \*visions.

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## Phantasticon

The term phantasticon comes from the Greek noun *phantastikon*, which was used by the Greek philosopher Aristotle (384–322 BC) to denote what is now known as the imagination or fantasy. It was reintroduced in or shortly before 1826 by the German physiologist and zoologist Johannes Peter Müller (1801–1858) to denote the hypothetical intracerebral structure which he deemed responsible for the mediation of imaginary images. According to Müller, the phantasticon controls the innermost springs of vision. As he writes, “For example, fever will stimulate the *Phantastikon* and cause the only reaction that it can have, namely, the production of free, spontaneous hallucinations.” With hindsight, one may note a certain conceptual analogy

between Müller’s ideas on the phantasticon and the \*qualia theory of hallucinations: In either case, a hypothetical intracerebral structure is endowed with the intrinsic capacity to generate hallucinatory phenomena.

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## Phantasticum

Also known as \*hallucinogen, hallucinogenic drug, hallucinogenic substance, magicum, phanerothyme, pseudohallucinogen, illusinogen, mysticomimetic, psychotic, \*psychotomimetic, \*eideticum, \*psychedelic, psychedelic drug, and psychedelic substance. The term phantasticum comes from the Greek verb *phantazestai*, which means to imagine. It was introduced in or shortly before 1924 by the German pharmacologist Louis Lewin (1850–1929) to denote a group of plants considered capable of evoking cerebral excitation in the form of hallucinations and \*illusions, along with other signs and symptoms of altered cerebral functioning. However, the scientific community, including Lewin himself, were not happy with the term phantasticum. Over the years, many other names were proposed to denote the group of substances which have a certain hallucinogenic potential. All the above terms are used more or less interchangeably to denote a group of chemical substances which – in relatively high doses – have the potential to alter consciousness and to evoke phenomena such as hallucinations, illusions, \*sensory distortions, \*delirium, loss of contact with reality, and sometimes coma and death. In 1979 the term \*entheogen was proposed by the American classical scholars Carl Anton Paul Ruck (b. 1935) et al. as an alternative for these terms, so as to reinstate the original spiritual connotations of substances like these in \*mysticism and shamanism. Today a person intentionally employing a phantasticum for the purpose of exploring the psyche may be called a \*psychonaut. For a more detailed account of this group of substances, see the entry Hallucinogen.

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## Phantéïdolie

The French term *phantéïdolie* is indebted to the Greek words *phantazestai* (to imagine) and *eidós* (image, appearance, idea). It was introduced in or shortly before 1973 by the French psychiatrist Henri Ey (1900–1977) to denote a variant of \*hallucinotic eidolia (i.e. a hallucination occurring in the absence of disease) characterized by complex, dreamlike images. As Ey explains, “*Phantéïdolies* [are] a variety of hallucinotic eidolias characterized by a complex form constituting a dream fragment (like hypnagogic hallucinations).” Ey uses the term *phantéïdolie* in opposition to the term \*protéïdolie.

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“the laws which govern the material world” (i.e. atmospheric conditions, gases, lenses and mirrors, and diseases of the eye). Dendy’s classification may be appreciated as a foreshadowing of the later division of \*illusions into \*cognitive illusions, \*physiological illusions, and \*physical illusions. A different use of the term phantom can be found in the work of the German psychiatrist Karl Ludwig Kahlbaum (1828–1899). In 1866 Kahlbaum used it to denote a \*centripetal hallucination, i.e. a hallucination mediated primarily by the peripheral parts of the nervous system, and thus conceptualized as being dependent on objective, external stimuli. Kahlbaum divides the class of phantoms into three subclasses, comprising \*stable hallucinations, \*eretic hallucinations, and \*functional hallucinations. The term phantom was used by him in opposition to the term \*phantasma or \*centrifugal hallucination. He considered both types of hallucination as variants of the overarching class of \*direct hallucinations. A third usage of the term phantom is its employment as an abbreviation for the term \*phantom limb illusion.

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## Phantom

The term phantom comes from the Greek noun *phantasma*, which means ghost or spectre. It was used in 1847 by the British surgeon Walter Cooper Dendy (1794–1871) as a synonym for the term ghost. Seeking to explain the perception of phantoms by recourse to natural phenomena, Dendy draws up the following classification. Starting from two grand classes, i.e. “ghosts of the mind’s eye, or phantasma”, and “ghosts of the eye, or optical illusion”, he conceptualizes ghosts of the mind’s eye as either \*illusory perceptions (i.e. phantoms mediated by the mind’s *conversion* of natural objects) or \*illusory conceptions (i.e. phantoms mediated by the mind’s own *creation*). The second class, ghosts of the eye, is conceptualized by him as being dependent on

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## Phantom Alloaesthesia

Also known as phantom alloaesthetic sensation. Both terms stem from the Greek words *phantasma* (ghost, spectre), *allos* (other), and *aïsthanesthai* (to notice, to perceive). They are used to denote a variant of alloaesthesia (i.e. \*allachaesthesia) in which the affected individual experiences a tactile sensation below the stump of an amputated limb after tactile stimulation of the contralateral, remaining limb. Or, to mention an example given by the British neurologist Macdonald Critchley (1900–1997), the experience of “stereognostic phantom sensations in the affected hand when an actual object is held in the normal hand”. Phantom alloaesthesia should not be confused with allachaesthesia proper or with \*spontaneous stereognostic sensations.



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**Phantom Alloaesthetic Sensation**

see Phantom alloaesthesia.

**Phantom Boarder Symptom**

see Phantom boarder syndrome.

**Phantom Boarder Syndrome (PBS)**

Also known as phantom boarder symptom. The expression phantom boarder symptom was introduced in or shortly before 1984 by the American psychiatrist and sex therapist Edward L. Rowan to denote a delusional syndrome involving the belief that someone uninvited is living in the affected individual's house (typically in the attic or on an upper floor). This delusional belief may occur in isolation or it may be secondary to hallucinatory experiences. In individuals suffering from dementia, it may be related to cognitive impairment and memory disturbances, and sometimes to the inability to recognize oneself in the mirror. In the latter case, the concomitant staring behaviour is called a \*mirror sign. On the basis of primary factor analyses, PBS has been classified as a \*misidentification syndrome. However, it is open to debate whether PBS is thematically and conceptually compatible with the other categories of the misidentification syndrome, whether it is worthy of the predicate syndrome (which would suggest that the cluster of symptoms may have a common pathophysiological and/or etiological origin), and even whether it is worthy of the predicate symptom. It would perhaps be more accurate to speak of a cluster of symptoms with a common or stereotyped theme. In most clinical descriptions, this cluster of symptoms includes paranoia, paranoid delusions, \*illusions, \*auditory hallucinations, \*visual hallucinations, and sometimes hallucinations in any of the other sensory modalities. Symptoms like these are known to occur quite frequently in individuals with a clinical diagnosis of \*schizophrenia spectrum disorder, as well as in Alzheimer's dis-

ease and other forms of dementia. In his textbook of 1913 the German psychiatrist Emil Kraepelin (1856–1926) describes many of the hallucinatory and paranoid delusional symptoms that are now attributed to PBS as symptoms in the context of *paranoiden Verblödungen* (i.e. 'paranoid madnesses') or paraphrenias. Kraepelin's text gives no indication of whether he regards these symptoms as standing out in any particular fashion from other paranoid symptoms. Nevertheless, his work on the paraphrenias is sometimes quoted as a conceptual precursor of PBS. The French notion of *délire du compagnon tardif*, which features in the 1972 thesis of the Portuguese psychiatrist José Carlos Dias Cordeiro, would seem to be a closer match with the notion of the phantom boarder syndrome.

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**Phantom Double**

see Autoscopic phenomenon.

**Phantom Eye Syndrome**

The term phantom eye syndrome is indebted to the Greek noun *phantasma*, which means ghost

or spectre. It is used to denote a variant of \*phantom limb characterized by the perceived presence, mostly of a painful nature, of an eye that is actually absent (due to enucleation, for instance). The notion of the phantom eye syndrome should not be confused with the notion of \*phantom vision (which refers to a collection of visual sensations occurring in individuals who have undergone eyeball enucleation) or with the \*Anton-Babinski syndrome (i.e. denial of blindness).

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### Phantom Illusion

The term phantom illusion is indebted to the Greek noun *phantasma*, which means ghost or spectre. It is used to denote the illusory alteration of the shape and/or orientation of the body, or parts thereof. As demonstrated in myriad experimental configurations, systematic perceptual distortions of the body, as well as changes in the apparent orientation of the body, can be evoked within seconds when muscle vibration is used to generate proprioceptive misinformation about limb position. Some examples of the ensuing phantom illusions are the \*illusory arm extension and the \*Pinocchio illusion. Vibration-induced phantom illusions were first described in 1972 in two separate and independent publications.

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### Phantom Impressions

see Sensed presence.

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### Phantom Limb Illusion

Also referred to as \*phantom or phantom limb. The term phantom comes from the Greek noun *phantasma*, which means ghost or spectre. The terms phantom and phantom limb refer to an arm or a leg, the presence of which is perceived although the limb itself is absent. One of the earliest known descriptions of a phantom limb illusion stems from the French surgeon Ambroise Paré (1510–1590), who published a case study in his 1511 treatise on gunshot wounds. Clinically, a phantom limb illusion can occur in individuals missing one or more limbs, either congenitally, or following an amputation. Following an amputation, up to 95% of the affected individuals may experience a phantom limb manifesting itself as a pleasant, tingling sensation. In addition, clinical research indicates that 50–80% of all amputees experience transient or permanent \*phantom sensations in their amputated limb, mostly in the form of \*phantom pain. The group of phantom sensations includes feelings of pain, pressure, warmth, cold, itching, burning, vibration, and hallucinated posture. Phantom sensations may also occur after the removal of body parts other than the limbs, i.e. after the amputation of a testicle, extraction of a tooth (as in \*phantom tooth pain), or enucleation (as in \*phantom eye syndrome). Phantom limbs often feel incomplete, or shorter in length than the limbs actually were, prior to the amputation. It has been suggested that the sudden loss of a limb or other body part is more likely to entail a phantom limb illusion than does a gradual loss, as in leprosy. A variant of phantom limb in which more than one non-existing arm or leg is perceived is called \*supernumerary phantom limb. Traditionally, the dominant theory for the neurophysiological correlate of phantom limbs has been based on the alleged involvement of neuromata at the ends of severed neurons within the remaining stumps. According to this peripheral hypothesis, the neuromata are responsible for generating random afferent signals that are subsequently interpreted by the CNS as pain. Since 1998 a competing hypothesis, put forward by the American neuro-

scientist Vilayanur S. Ramachandran (b. 1951), has been gaining influence. This hypothesis, called the central deafferentiation hypothesis, involves the primary involvement of cerebral cortical reorganization. The validity of this hypothesis has been indicated by neuroimaging studies which suggest that cortical reorganization does indeed occur after amputation of a limb and that the degree of phantom limb pain would seem to correlate with the extent of cortical reorganization. In 1934 the term \*alghallucinosi was introduced by the Belgian neuropathologist Ludo van Bogaert (1897–1989) as a generic term for the notions of phantom pain and phantom limb.

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## Phantom Nose Illusion

see Pinocchio illusion.

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## Phantom Pain

The term phantom pain is indebted to the Greek noun *phantasma*, which means ghost or spectre. It is used to denote a pain perceived in a body part (such as a limb, tooth, or ear) that is either absent or anaesthetic. Phantom pain is a conceptual and phenomenological variant of the \*phantom limb illusion, the latter being characterized by the perceived presence of a limb that is actually absent. Phantom pain may be classified as a variant of referred pain. It may also be classified as a variant of the \*hallucinated pain syndrome. The issue whether pain can be experienced in a hallucinated form is a knotty philosophical issue; for a further discussion of this issue, see the entry Hallucinated pain syndrome. Research by the American neuroscientist Vilaya-

nur S. Ramachandran (b. 1951) is indicative of the involvement of cortical reorganization in the mediation of phantom pain. It has been suggested that phantom pain may be related in a conceptual as well as a phenomenological sense (and perhaps also in a pathophysiological sense) with other mnemonic events such as \*flashbacks in post-traumatic stress disorder (PTSD), drug-related \*flashbacks, \*hallucinogen-induced persistent perception disorder (HPPD), \*palinopsia, \*reperceptive hallucinations, \*eidetic imagery, and \*flashbulb memories. In 1934 the term \*alghallucinosi was introduced by the Belgian neuropathologist Ludo van Bogaert (1897–1989) as a generic term for the notions of phantom pain and phantom limb.

### Reference

- Ramachandran, V.S., Blakeslee, S. (1998). *Phantoms in the brain: Probing the mysteries of the human mind*. New York, NY: Quill.

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## Phantom Sensation

The term phantom sensation is indebted to the Greek noun *phantasma*, which means ghost or spectre. It refers to any body part that may be perceived while it is not actually present. Conceptually, the notion of the phantom sensation is equal to the notion of the \*phantom limb illusion, except that it refers to perceived sensations in all non-existing body parts, whereas the term phantom limb restricts itself to perceived sensations in non-existent limbs. The group of phantom sensations includes feelings of pain, pressure, warmth, cold, itching, burning, vibration, and hallucinated posture.

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## Phantom Smell

see Olfactory hallucination.

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## Phantom Sounds

see Tinnitus.

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## Phantom Tooth Pain

Also known as atypical odontalgia. The term phantom tooth pain is indebted to the Greek noun *phantasma*, which means ghost or spectre. It is used to denote a syndrome of persistent pain or \*paraesthesia experienced in a tooth or other oral tissue, typically arising after a dental or surgical procedure within the oral cavity. Reportedly, it can also arise after a traumatic injury of the face and after a routine inferior alveolar nerve block. When phantom tooth pain occurs after tooth extraction, the pain is typically located in the edentate area. The incidence of phantom tooth pain following extraction is estimated to be as high as 3%. Conceptually, phantom tooth pain is analogous to other \*phantom pain syndromes.

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## Phantom Vision

The term phantom vision is indebted to the Greek noun *phantasma*, which means ghost or spectre. It was introduced in or shortly before 1969 by the American neurologist Robert Cohn (d. 2006) to denote an illusory or hallucinated visual sensation occurring after unilateral or bilateral eyeball enucleation. The seven individuals originally reported by Cohn had all suffered from traumatic enucleation due to explosives. The visual sensations they reported were described by him as follows: "In each case the individuals indicated that they had transient experience of visual sensations in the absent eye. Some disclosed the feeling that they were actually seeing normally with the ablated eye; but this was always accompanied by a subsequent feeling of 'strangeness or craziness'." Cohn's notion

of phantom vision is analogous to that of the \*phantom limb. The phenomena described by him include \*unformed and \*formed visual hallucinations, \*photopsia, \**Eigengrau* (i.e. idioretinal light), and a condition reminiscent of the \*Anton–Babinski syndrome (i.e. denial of blindness). However, Cohn's subjects differed from individuals with the Anton–Babinski syndrome in that they were not persistent in their belief that they could actually see with their enucleated eyes. As to the pathophysiology of phantom vision, Cohn postulated an association with peripheral rather than central irritative effects. The occurrence of visual percepts during periods of mental relaxation was interpreted by him as a sign "that the patients responded to normally subliminal stimuli." Conceptually and phenomenologically, phantom vision is related to \*Charles Bonnet syndrome.

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## Phantosmia

see Olfactory hallucination.

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## Phencyclidine-Induced Hallucination

Phencyclidine is known under many names, including angel dust, angeldustine, and rocket fuel. The term is a truncation of the chemical name 1-(1-phenylcyclohexyl)piperidine. Abbreviated to PCP, it is classified as a dissociative anaesthetic with hallucinogenic and other neurotoxic properties. Its effects on the CNS are attributed to the joint action of NMDA receptor antagonism, dopamine receptor agonism, and the inhibition of the reuptake of dopamine, norepinephrine, serotonin, and other neurotransmitters. PCP was first synthesized in 1926 and tested as a surgical anaesthetic during the 1950s. In 1963 it was marketed as Sernyl (a name reportedly derived from serenity) and in 1967 as a veterinary anaesthetic as Sernylan, but in both cases the adverse side effects prompted the pharmaceutical company to immediately withdraw the substance from the market. As a street drug, PCP is taken orally, intravenously, rectally, vaginally, and through smok-

ing or snorting. Its effects are dose dependent. Especially in higher doses, the effects include \*hyperacusis, \*auditory hallucinations (and less commonly hallucinations in any of the other sensory modalities), \*metamorphopsias, feelings of weightlessness, \*flashbacks, delusions, mania, \*delirium, disorientation, \*body schema illusions, and \*out-of-body experiences. Occasionally, the use of PCP may entail a phencyclidine-induced psychotic disorder, a condition which may be indistinguishable from major psychotic disorders such as \*schizophrenia. Severe intoxication may result in catatonia, a \*twilight state, coma, convulsions, and death.

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## Phobetor

Also known as Phobitor, Icelus, and Ikelos. The name Phobetor is related to the Greek noun *phobos*, which means fear or anxiety. In Greek mythology, Phobetor was considered one of the gods of \*dreams or \*nightmares, capable of visiting his victims in their dreams in the form of an animal or monster. He was known as a brother (or son, in an alternative reading) of Hypnos, the god of sleep. Being one of the \*Oneiroi, he was considered a ruler of \*visions.

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## Phobitor

see Phobetor.

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## Phoneme

Also known as \*phonemic hallucination. Both terms are indebted to the Greek noun *phōnème*, which means voice or sound. In biomedicine, the term phoneme was introduced in or shortly before 1900 by the German neurologist Carl Wernicke (1848–1904) to denote a \*verbal auditory hallucination (i.e. ‘voices’). Wernicke uses the term in opposition to \*akoasm, which is a synonym for \*nonverbal auditory hallucination.

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## Phonemic Hallucination

Also known as \*phoneme. Both terms are indebted to the Greek noun *phōnème*, which means voice or sound. In the 1982 *Manual for the Assessment and Documentation of Psychopathology* (AMDP) the term phonemic hallucination features as a synonym of the term \*verbal hallucination. The AMDP defines verbal (phonemic) hallucinations as follows: “Perception of human voices without external stimuli. Voices of humanoids are also included, e.g., God, Satan, spacemen, leprechauns. There are different degrees of clarity and substance to the voices. The voices may speak directly to the patient or may be experienced (overheard) as conversations between third persons. It is sometimes difficult to differentiate phonemes from... ‘Thought Insertion’.”

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## Phonism

The term phonism comes from the Greek noun *phōnème*, which means voice or sound. It is used in \*synaesthesia research to denote a hallucinated sound which is triggered by a sense perception in a different sensory modality. In accordance with the sensory modality involved, phonisms are divided into categories such as olfactory or smell phonism, taste phonism, optical or light phonism, tactile or touch phonism, pressure phonism, kinaesthetic or movement phonism, and temperature phonism. The term phonism is used in opposition to terms such as \*photism, \*gustatism, and \*olfactism.

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## Phonophobia

see Hyperacusis.

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## Phonopsia

Also known as sound photism, sound-seeing, and chromatic–phonemic synaesthesia. The term phonopsia comes from the Greek words *phōnème* (voice, sound) and *opsis* (seeing). It is used in \*synaesthesia research to denote a hallucinated sound triggered by a regular visual percept.

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## Phosphene

Also known as \*unstructured photopsia. The term phosphene comes from the Greek words *phōs* (light) and *phainein* (to shine). It is used to denote a transient flash or spark of light, commonly referred to as 'seeing stars'. Phosphenes

are \*visual hallucinations of a \*simple or \*unformed nature. They are classified either as a type of \*photopsia or as a type of \*positive spontaneous visual phenomenon (PSVP). Phosphenes have been described in the medical literature since at least the fifth century BC. Ancient texts on phosphenes tend to focus on the alleged capacity of the eye to generate light for the purpose of vision. During the 19th century, the Bohemian physiologist Johannes Evangelista Purkyně (1787–1869) was among the first to make a significant contribution to the modern conception of phosphenes. Today the terms \*deformation phosphene and \*pressure phosphene are used interchangeably for a type of phosphene that can be provoked under physiological conditions through pressure onto the eyeball. Such types of phosphene may take the shape of a darkening of the visual field, of diffuse colour patches, of changing, scintillating, and deforming light-grids with occasional dark spots, and of fields with sparse, but intense blue points of light. Brief, recurrent, vertical phosphenes occurring in the temporal field of one eye are referred to as \*Moore's lightning streaks. When phosphenes can be provoked by horizontal movement of the eyes, they are called \*movement phosphenes. When they follow rapid eye movements (\*REMs), especially in a dark environment, they are called \*flick phosphenes. When they occur in reaction to a sudden sound, they are called \*sound phosphenes. Phosphenes occurring in reaction to convergence of the eyes are designated as \*convergence phosphenes. Phosphenes presenting as \*formed hallucinations are sometimes referred to as \*imagistic phosphenes. Pathophysiologically, phosphenes are associated with the random firing of neurons within any part of the \*visual system, i.e. ranging from the retina to the lateral geniculate and striate cortex. They can be provoked artificially by means of mechanical, electrical, and magnetic stimulation. Pathological causes of phosphenes include retinal detachment, optic neuropathy, and occipital haemorrhage. Movement phosphenes are associated primarily with optic neuritis. When phosphenes are attributed to intraocular mechanisms, they are classified as \*entoptic phenomena.

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## Phosphorescence of the Retina

see Photopsia.

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## Photically Induced Hallucination

Also known as flicker-induced hallucination, hallucinatory flicker-induced experiences, and \*Purkinje's colours. All four terms are used to denote a type of \*geometric visual hallucination induced by a flickering light, such as that produced by a stroboscope or by sunlight interrupted by the shadows of trees, as observed by an individual moving along those trees. Phenomenologically, photically induced hallucinations may resemble the geometric \*form-constants as described by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979). Under laboratory conditions many different shapes have been reported, including \*gratings, \*spirals, concentric circles, and fan blades. However, contrary to the hallucinogen-induced hallucinations described by Klüver, photically induced hallucinations tend to lack an extreme saturation of colour. The mediation of the geometric forms is attributed to stripe patterns of neural activity in specialized cortical columns whose spatial orientation on the visual cortex combines with a nonlinear retinocortical mapping. Photically induced hallucinations were probably described for the first time in 1819 by the Bohemian physiologist Johannes Evangelista Purkyně (1787–1869). A special type of the photically induced hallucination is the \*television-induced hallucination.

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## Photism

The term photism comes from the Greek verb *phōtizein*, which means to give light, to illuminate. It is used in \*synaesthesia research to denote a hallucinated colour sensation triggered by a sensory stimulus which affects a different sensory modality. In accordance with the sensory modality involved, photisms are divided into categories such as olfactory or smell photism, taste photism, auditory or sound photism, tactile or touch photism, pressure photism, kinaesthetic or movement photism, and temperature photism. A special type of photism in which light is seen as emanating from one's body is called \*body photism. The term photism is used in opposition to terms such as \*phonism, \*gustatism, and \*olfactism.

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## Photographic Memory

see Eidetic image.

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## Photome

see Photopsia.

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## Photopsia

Also known as photome, phosphorescence of the retina, scintillations, and suffusio scintillans. The term photopsia comes from the Greek words *phōtizein* (to give light, to illuminate) and *opsis* (seeing). It is used to denote a group of \*simple or \*geometric visual hallucinations such

as \*phosphenes, luminous rays, coruscations, heat waves, \*snow lights, and \*Moore's lightning streaks. In ordinary parlance, these phenomena are referred to as light flashes. Simple forms of photopsia are designated as \*unstructured photopsia, while the geometric forms are designated as \*structured photopsia. Sometimes photopsia may lead the affected individual to perceive fleeting illusory images or \*passage hallucinations. It has been speculated that photopsia may even act as a \**point de repère* for the development of \*complex visual hallucinations. As the British surgeon Walter Cooper Dendy (1794–1871) wrote in 1847, “The brilliant beams in the *suffusio scintillans*, so varied and so whimsical, might be readily moulded into human form by the imagination of an enthusiast or the feelings of the ghost-seer, who is usually morose and melancholy, in a state of *longing* for a ghost or a mystery.” Photopsia may be classified as a subclass of the \*positive spontaneous visual phenomenon (PSVP). When attributable to intraocular pathology, it may be classified as an \*entoptic phenomenon. Pathophysiologically, photopsia is associated primarily with aberrant neuronal discharges in any part of the visual system. Etiologically, it is associated with such diverse conditions as posterior vitreous detachment (PVD), retinal break, acute zonal occult outer retinopathy, retinal migraine, migraine with aura, \*migraine aura without headache, metastatic tumours, occipital epilepsy, cocaine intoxication, \*hallucinogen-induced persistent perception disorder (HPPD), and \*digitalis intoxication. Historically, the term photopsia is used in opposition to the term \*morphopsia, the latter term referring in a broad sense to \*formed visual hallucinations.

### References

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- Dendy, W.C. (1847). *The philosophy of mystery*. New York, NY: Harper & Brothers.
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## Phrenalgia

see Algopsychalia.

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## Physical Illusion

Also known as stimulus-distortion illusion. Both terms refer to an \*illusion attributable to physical rather than neurophysiological or cognitive mechanisms. Some examples of physical illusions are the \*mirage, the \*rainbow, the \*anthelec arc, the \*anthelec, the \*Brocken spectre, the \*Ulloa circle, and the Moiré pattern. The term physical illusion is used in opposition to the terms \*physiological illusion and \*cognitive illusion. The term stimulus-distortion illusion is used in opposition to the term \*perceiver-distortion illusion.

### References

- Gregory, R.L. (1991). Putting illusions in their place. *Perception*, 20, 1–4.
- Ninio, J. (2001). *The science of illusions*. Translated by Philip, F. Ithaca, NY: Cornell University Press.

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## Physiological Blind Spot

see Blind spot.

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## Physiological Hallucination

The term physiological hallucination is used to denote a hallucination occurring in the absence of any other psychopathology, and in the presence of preserved insight. It was used in 1845 by the French alienist Alexandre Jacques François Briere de Boismont (1797–1881) to denote a hallucination which is compatible with reason, and which can sometimes be evoked at will. As Briere de Boismont wrote, “*Physiological hallucination* is constantly in touch with the dominant thought, the mother idea, the ideal; it is an echo, an adjunct, a stimulant which decides the success. Whatever its duration, it has the same force at the start as at the end and it does not trouble the reason.” Briere de Boismont's notion of physiologi-



cal hallucination includes the \*ecstatic vision. As he wrote, "It is certain that the most celebrated men have been liable to hallucinations, without their conduct offering any signs of mental alienation." Brierre de Boismont used Joan of Arc as an example, asserting that "the voices, the visions, the sensations of touch and smell of Jeanne d'Arc were true hallucinations, in essence identical with those of the insane." A few years later the French physician A. Piroux (1803?–1884?) formulated a rather similar definition, asserting that "a physiological hallucination is one that is entirely independent of any morbid state whatsoever." Both men used the term physiological hallucination in opposition to the term \*pathological hallucination. As Brierre de Boismont stated, "However much the mind may be concerned in the production of hallucinations, they cannot all be referred to this source; there are others which are produced by disease, by certain substances introduced into the body, &c. The phenomena remain essentially the same, but the cause of them is different. For this reason we have divided hallucinations into two classes – those depending on moral causes, and those depending on physical causes."

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- Leudar, I., Thomas, P. (2000). *Voices of reason, voices of insanity. Studies of verbal hallucinations*. London: Routledge.
- Piroux, A. (1861). *Fragments d'études sur les hallucinations*. Thèse Université de Montpellier.

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### Physiological Illusion

Also known as mechanism illusion and perceiver-distortion illusion. All three terms refer to an \*illusion attributable to neurophysiological rather than physical or cognitive mechanisms. Some well-known examples of physiological illusions are the \*afterimage, the \*Rubin figure, and the \*Poggendorff illusion. The term physiological illusion is used in opposition to the terms \*physical illusion and \*cognitive illusion. The term perceiver-distortion illusion is used in opposition to \*stimulus-distortion illusion.

#### References

- Gregory, R.L. (1991). Putting illusions in their place. *Perception*, 20, 1–4.
- Ninio, J. (2001). *The science of illusions*. Translated by Philip, F. Ithaca, NY: Cornell University Press.

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### Physiological Scotoma

see Blind spot.

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### Picasso, Pablo Ruiz (1881–1973)

A famous Spanish painter who may have suffered from \*migraine aura without headache. This suggestion is based on Picasso's paintings of women's faces displaying a peculiar vertical split which is reminiscent of \*illusory splitting, i.e. a visual distortion that may occur in the context of \*migraine aura. In actual fact, there is no other indication that Picasso suffered from migraine.

#### References

- Ferrari, M.D., Haan, J. (2000). Migraine aura, illusory vertical splitting, and Picasso. *Cephalalgia*, 20, 686.
- Podoll, K., Robinson, D. (2000). Mosaic illusion as visual aura symptom in migraine. *Neurology, Psychiatry and Brain Research*, 8, 181–184.

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### Picture Sign

A term used to denote a \*misidentification syndrome in which the affected individual is under the impression that persons seen in a photograph are actually present in external, three-dimensional space. This impression may be so powerful that the affected individual speaks to the portrayed individuals or attempts to put food into their mouths. The picture sign is a \*cognitive illusion described predominantly in elder persons acquainted with \*visual hallucinations or \*illusions. Etiologically, the picture sign is associated primarily with Alzheimer's disease and other types of dementia. Two related phenomena are the \*magazine sign and the \*TV sign.

**Reference**

Wertheimer, J. (1992). *Some hypotheses about the genesis of visual hallucinations in dementias*. In: *Delusions and hallucinations in old age*. Edited by Katona, C., Levy, R. London: Gaskell.

**Pinocchio Illusion**

Also referred to as phantom nose illusion. The eponym Pinocchio illusion refers to Pinocchio, the protagonist of the childrens' book *The Adventures of Pinocchio* by the Italian author Carlo Lorenzini, better known as Carlo Collodi (1826–1890). It constitutes a \*motor illusion characterized by an illusory elongation of the nose. The Pinocchio illusion can be induced with a variant of the procedure that is used to produce the \*illusory arm extension. The latter illusion can be produced by means of vibratory stimulation of the biceps tendon of a bent and immobilized arm in a blindfolded test person. This typically results in an illusory feeling of movement around the elbow, followed by a \*kinaesthetic illusion of extension of the lower arm. To create the Pinocchio illusion, the same procedure is followed, with the exception that the test person uses the fingertips of the bent and immobilized arm to touch the tip of the nose. Because the fingertips provide tactile information on the location of the nose, the procedure entails a \*kinaesthetic illusion of the tip of the nose moving away from the face. The mediation of the Pinocchio illusion is attributed to the interplay between basic sensorimotor impulses, higher cognitive processes, and central sensory processes in parietal areas involved with bodily representations and the representation of movement. The Pinocchio illusion may also be classified as a vibration-induced \*phantom illusion or as a \*body schema illusion.

**References**

- Burrack, A., Brugger, P. (2005). Individual differences in susceptibility to experimentally induced phantom sensations. *Body Image*, 2, 307–313.
- Collodi, C. (1996). *The adventures of Pinocchio*. Translated by Lucas, A.L. Oxford: Oxford University Press.
- Lackner, J.R. (1988). Some proprioceptive influences on the perceptual representation of body shape and orientation. *Brain*, 111, 281–297.

**Piroux's Definition of Hallucinations**

In 1861 the French physician A. Piroux (1803?–1884?) defined hallucinations as follows: "Exterior objects make an impression upon our sensorial surfaces, that impression is transmitted towards the brain that receives it, and from there it passes to the sphere of the understanding. Thus the not-I is brought in contact with the I, by means of three phenomena, namely: *sensorial impression or sensation, transmission, perception* of that sensation. Having stated this, we say that a hallucination is a *perception without an adequate sensation*."

**Reference**

Piroux, A. (1861). *Fragments d'études sur les hallucinations*. Thèse Université de Montpellier.

**Plagiopsia**

The term plagiopsia comes from the Greek words *plagios* (tilted) and *opsis* (seeing). It is used to denote a visual distortion in which objects are perceived as inclined. As a phenomenon, plagiopsia was described as early as 1933 by the British neurologists Macdonald Critchley (1900–1997) and Fergus Ferguson. It is associated primarily with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy, and with the use of \*hallucinogenic substances such as LSD and mescaline. It is commonly classified as a \*metamorphopsia, which is itself classified as a \*sensory distortion. In a conceptual and phenomenological sense, plagiopsia is closely related to \*environmental tilt and \*tortopia.

**References**

- Critchley, M., Ferguson, F. (1933). Migraine. *Lancet*, 1, 123–126.
- Klee, A., Willanger, R. (1966). Disturbances of visual perception in migraine. *Acta Neurologica Scandinavica*, 42, 400–414.
- Wieser, H.G. (2000). *Temporal lobe epilepsies*. In: *Handbook of clinical neurology. Volume 73. The epilepsies. Part II*. Edited by Vincken, P.J., Bruyn, G.W. Amsterdam: Elsevier Science Publishers.

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## Plateau's Spiral

see Archimedes' spiral.

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## Plaut's Hallucinosi

The eponym Plaut's hallucinosi refers to the German psychiatrist Felix Plaut (1877–1940). It was conceptualized by Plaut in or shortly before 1913 as a form of \*syphilitic hallucinosi occurring in the absence of any neurological signs. Prior to Plaut's conceptualization of this clinical syndrome, the term 'syphilitic madness' was employed.

### References

- Plaut, F. (1913). *Über Halluzinosen der Syphilitiker*. Berlin: Verlag von Julius Springer.
- Quétel, C. (1992). *The history of syphilis*. Translated by Braddock, J., Pike, B. Baltimore, MA: Johns Hopkins University Press.
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## Poetzl Phenomenon

see Pötzl phenomenon.

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## Poggendorff Illusion

The eponym Poggendorff illusion refers to Johann Christian Poggendorff (1796–1877), a German physicist who described the concomitant phenomenon in 1860, inspired by a drawing sent to him by the German astrophysicist Johann Karl Friedrich Zöllner (1834–1882) of what later would become known as the \*Zöllner illusion. The Poggendorff illusion is a \*geometric-optical illusion in which the two ends of a straight diagonal line seem to be offset from each other when the line is interrupted by a figure with parallel vertical borders, such as a bar. The eponym Poggendorff illusion was coined in or shortly before 1896 by the German scientist Ernst Burmester. The Poggendorff illusion is commonly classified as a \*physiological illusion.

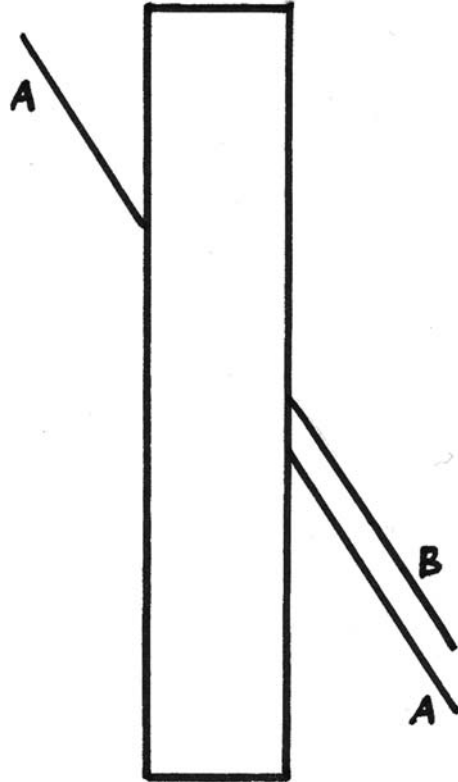


Fig. 1 Poggendorff illusion. Illustration by JDB

### References

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- Ninio, J. (2001). *The science of illusions*. Translated by Philip, F. Ithaca, NY: Cornell University Press.
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## Point de repère

The French term *point de repère* translates loosely as 'guiding mark' or 'target'. It was introduced in or shortly before 1884 by the French psychologist Alfred Binet (1857–1911) to denote a

stimulus or object in the extracorporeal world that acts as a nucleus of sensation around which the perceptual system may build up an \*illusion or hallucination. In \*crystallomancy or crystal gazing, for example, reflections of light observed within the diaphanous medium are believed to act as *points de repère* for the development of \*visions or \*visual hallucinations. Likewise, clouds or banks of fog may act as *points de repère* for the development of \*apparitions and \*collective hallucinations. As noted by Binet, *points de repère* constitute subconsciously perceived guiding marks, whereas the resulting illusions or hallucinations are consciously perceived. The pattern or image suggested by *points de repère* can be exceptionally strong, as is indicated in the following passage by the British classical scholar, writer, and poet Frederic Myers (1843–1901). “A hypnotised subject – hypnotised but in a fully alert state – can often be caused by suggestion to see (say) a portrait upon a blank card; and will continue to see that portrait on that card, after the card has been shuffled; thus showing that he discerns with unusual acuteness such *points de repère*, or little guiding marks, as may exist on the surface of even an apparently blank card.”

### References

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- Myers, F.W.H. (1903). *Human personality and its survival of bodily death. Volume I*. London: Longmans, Green, and Co.

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### Poltergeist Activity

see Poltergeist manifestation.

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### Poltergeist Effect

see Poltergeist manifestation.

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### Poltergeist Manifestation

Also known as poltergeist effect and poltergeist activity. All three terms are indebted to the Ger-

man noun *Poltergeist*, which means rattling ghost or rumbling ghost. In parapsychology they are used to denote a variety of sounds and movements of objects which lack a physical explanation, and which are therefore attributed to the interventions of a poltergeist. At least since the Middle Ages, poltergeists have been conceptualized as invisible spirits who have the capacity to produce sounds (such as raps and crashing noises), to move or break objects, to set fire, and to levitate objects and occasionally even persons. In parapsychology, their presence is typically assumed when such unexplained disturbances occur repeatedly in the vicinity of a child or adolescent, less often in the vicinity of an adult. Because of the apparent association with a person rather than a place, an alternative parapsychological explanation is that poltergeist manifestations are due to subconscious telekinetic or psychokinetic abilities of the individual involved, rather than to the action of spirits. The historical literature abounds with references to poltergeist manifestations. There are several well-documented cases from authorities such as the British physicist William Fletcher Barrett (1844–1925), the French physiologist and Nobel laureate Charles Robert Richet (1850–1935), the Italian psychiatrist and criminologist Cesare Lombroso (1836–1909), and the Swiss psychiatrists Eugen Bleuler (1857–1939) and Carl Gustav Jung (1875–1961). In biomedicine, alleged poltergeist manifestations tend to be attributed to fraud, self-delusion, or hallucinatory or illusory experiences. The perceived noises may also be designated as \*nonverbal auditory hallucinations (i.e. \*akoasms), which may take the form of a \*collective hallucination when they are perceived simultaneously by various individuals. It has also been suggested that alleged poltergeist manifestations which are not attributable to fraud may be due to physical forces, such as electromagnetism, static electricity, ultrasound, or a Casimir effect.

### References

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- Roll, W.G. (1972). *The poltergeist*. Metuchen, NJ: Nelson Doubleday.

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## Polyaesthesia

see Tactile polyaesthesia.

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## Polymodal Hallucination

see Compound hallucination.

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## Polyopia

Also known as polyopsia. Both terms stem from the Greek words *polus* (much, many) and *opsis* (seeing). They refer to the perception of an image that repeats itself within the visual field. The ensuing coexistence of various similar images within the field of vision is called \*multiplication. The term polyopia has been in use at least since the 1850s. In 1928 the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) divided polyopia into ‘objective’ polyopia, hallucinatory polyopia, and imaginal polyopia. In Klüver’s system the term ‘objective’ polyopia refers to the perception of multiple identical images in regular visual perception (i.e. ‘ghosting’) and the term hallucinatory polyopia to the perception of multiple identical hallucinatory images. Klüver uses the term imaginal polyopia to denote a special form of polyopia in which the perception of part of an object gives rise to the subjective sensation of seeing the whole, and the subsequent idea of a coexistence of multiple versions of that object. Klüver illustrates the latter phenomenon with the following first-person account by one of his test persons. “M. passed me on my left side. I saw nothing but a part of his cloak. Automatically it turned into the whole figure of M.; and I had now some sort of idea that a large number of M.’s moved away from me in a curved line, the M. in the foreground being the smallest one. I was unable to say whether it was a very strong image or vision; phenomenally, the many M.’s were projected into the perceived space of the dark room.” Pathophysiologically, polyopia is associated with either peripheral or central nervous system dysfunction. Peripheral variants of polyopia are associated primarily with corneal opacities, corneal irregularities, and lens irregularities. The ensuing polyopic images tend to be stable over time. Central variants of

polyopia, also referred to as cerebral polyopia, are associated pathophysiologically with aberrant neuronal discharges affecting the occipital or occipito-parietal lobe. Etiologically, they are associated with a variety of conditions, including encephalitis, trauma, migraine, focal epileptic seizures, and the use of \*hallucinogens such as mescaline and LSD. Cases of polyopia occurring in the context of an \*aura are referred to as \*ictal illusions. The literature on cerebral polyopia indicates that in this variant the number of image reduplications tends to be restricted to two or four images. Single-image reduplications are referred to as \*monocular diplopia. In cases of multiple image reduplications, which may be arranged in a row, a column, or a grid-like pattern, the term \*entomopia is used. Polyopia is commonly classified as a rare type of \*palinopsia, which itself constitutes a type of \*visual perseveration. Visual perseveration, in turn, tends to be classified as a \*reduplicative phenomenon or a type of \*metamorphopsia.

## References

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- Lopez, J.R., Adornato, B.T., Hoyt, W.F. (1993). ‘Entomopia’: A remarkable case of cerebral polyopia. *Neurology*, 43, 2145–2146.
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## Polyopic Heautoscopy

The term polyopic heautoscopy comes from the Greek words *polus* (much, many), *opsis* (seeing), *heautou* (‘of oneself’), and *skopeō* (I am looking at). It translates loosely as ‘seeing [something of] oneself in multiple images’. The term is used to denote a variant of \*heautoscopy in which multiple \*doubles are perceived. The ensuing coexistence of similar images within the field of vision is called \*multiplication. The earliest known account of polyopic heautoscopy was published in 1826 by the German physiologist and zoologist Johannes Peter Müller (1801–1858). As Müller recounts, “One day, after having been involved in a lively scientific debate and without food for a while, Professor X returned home. His way led

him through a field with clumps of trees. Suddenly, he saw between 12 and 15 copies of himself at various stages of life. His doubles were attired according to their presumed age and hence some wore clothes no longer in fashion. They walked around paying little attention to one another. The professor needed to make a great mental effort to convince himself that he was experiencing a hallucination and to conjure the copies away. This experience was more than just seeing a double.” In 2006, the Swiss neuroscientists Peter Brugger et al. reported a case of polyopic heautoscopy in a 41-year-old man who saw two male and three female doubles (also referred to as \*heterosexual heautoscopy) in the right hemispace. These doubles would speak to him, and mimic his movements and gestures (a phenomenon known as heautoscopic echopraxia). The appearance of the doubles was preceded by the subject’s sensation of being split into two halves, along the median line of the body. The heautoscopic hallucinations were associated with a tumour in the right insular region of the left temporal lobe. Other known cases in the literature have been attributed to tumours and/or focal epileptic seizures in the temporal, parietal, and occipital lobes. Although any of these areas may be involved in the mediation of polyopic heautoscopy, the condition tends to be attributed primarily to focal damage to the temporo-parietal junction of either hemisphere.

### References

- Brugger, P., Blanke, O., Regard, M., Bradford, D.T., Landis, Th. (2006). Polyopic heautoscopy: Case report and review of the literature. *Cortex*, 42, 666–674.
- Müller, J. (1826). *Ueber die phantastischen Gesichterscheinungen*. Koblenz: Hölscher.

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### Polyopsia

see Polyopia.

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### Polysensorial Hallucination

see Compound hallucination.

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### Polysensory Hallucination

see Compound hallucination.

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### Polysensual Hallucination

see Compound hallucination.

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### Popular Hallucination

see Epidemic hallucination.

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### Porromacropsia

see Porropsia.

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### Porromicropsia

see Porropsia.

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### Porropsia

The term porropsia comes from the Latin verb *portare* (to carry, to transport, to take away) and the Greek verb *opsis* (seeing). It translates loosely as ‘seeing things being carried away’ and is used to denote a visual distortion in which stationary objects appear to be moving away from the observer. The German neologism *Porropsie* was introduced in or shortly before 1904 by the German psychiatrist and neurologist Karl Heilbronner (1869–1914). Phenomenologically, various types of porropsia can be discerned. In 1937 the Japanese physician Chuo-Gauka-Iho Arimoto proposed a classification of three phenomenological types, which he referred to as porromicropsia, porropsia proper, and porromacropsia. In Arimoto’s system, the term porromicropsia refers to a type of porropsia in which seemingly receding objects also appear to decrease in size, whereas in porropsia proper no changes are perceived in the apparent size. The term porromacropsia is used by him to denote a condition in which seemingly receding objects

appear to increase in size. As a class, porropsia may be classified as a \*metamorphopsia or a type of \*dysmetropsia. It may present as an isolated symptom or as part of a cluster of symptoms known as the \*Alice in Wonderland syndrome. Although Heilbronner considered porropsia to be an \*entoptic phenomenon, its occurrence in the context of \*aurae indicates that a central origin is equally possible. Today the concept of porropsia would seem to be assimilated by the concept of \*teleopsia, which refers to a visual distortion in which objects appear to be further away than they are. Although the two phenomena are not identical, the terms porropsia and teleopsia are sometimes used as if they were synonyms.

#### Reference

Vujić, V., Ristić, J. (1939). Ein Fall von Porropsie mit gestörter palpatorischer Größenschätzung. *Deutsche Zeitschrift für Nervenheilkunde*, 150, 30–38.

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### Positive Afterimage

A term used to denote an \*afterimage that has the same relative brightness relations as the primary optical stimulus (for example, a dark blue afterimage of a dark blue pen). The term positive afterimage is used in opposition to the term \*negative afterimage, which refers to an afterimage that manifests itself in complementary colours (for example, a dark blue afterimage of a bright yellow pen). Two physiologically occurring positive afterimages are \*Hering's afterimage and the \*Hess afterimage. The occurrence of pathological positive afterimages has been reported in drug-induced states such as LSD and mescaline intoxication, as well as in drug-induced \*flashback phenomena and \*hallucinogen-induced persistent perception disorder (HPPD). Phenomenologically as well as conceptually, these latter types of positive afterimage would seem to be closer akin to central phenomena such as \*palinopsia, \*polyopia, and the \*trailing phenomenon, than to physiological afterimages, which are generally considered to be \*entoptic in origin. The positive afterimage may be classified as a \*physiological illusion.

#### References

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- Brown, J.L. (1965). *Afterimages*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: Wiley.

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### Positive Autoscopy

The term positive autoscopy is indebted to the Greek words *autos* (self) and *skopeō* (I am looking at). It was introduced in or shortly before 1903 by the French physician and psychologist Paul Auguste Sollier (1861–1933). Sollier uses the adjective 'positive' to emphasize the perceived presence of a \*double where none should be, and to distinguish this symptom from \*negative autoscopy, a symptom characterized by the transient inability to perceive one's reflection in a mirror. Under the heading positive autoscopy, Sollier subsumes three subclasses, i.e. \*specular autoscopy (an \*autoscopic hallucination depicting one's exact mirror image), \*dissimilar autoscopy (an autoscopic hallucination that is identified as one's self, even though it does not display one's exact physical characteristics), and \*coenesthetic autoscopy (a double whose presence is sensed rather than perceived).

#### Reference

- Sollier, P. (1903). *Les phénomènes d'autoscopie*. Paris: Félix Alcan.

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### Positive Hallucination

A synonym for the term hallucination. The adjective positive refers to the observation that something is perceived as being present, while lacking an appropriate source in the external world. The term positive hallucination is used in opposition to \*negative hallucination, a term that is used to denote the failure to perceive an object or stimulus which is actually present in the external world, and which lies within the observer's range of perception.

**Reference**

Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

**Positive Hemianopia**

see Hemianopia.

**Positive Scotoma**

A term used to denote a type of \*scotoma (i.e. an area of loss or impairment of vision) presenting as a black spot within the field of vision. The term positive scotoma is used in opposition to the term \*negative scotoma, which refers to a type of scotoma that tends to go unnoticed by the affected individual and is detected only upon examination of the visual field.

**Reference**

Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.

**Positive Spontaneous Visual Phenomenon (PSVP)**

The expression positive spontaneous visual phenomenon is used as an umbrella term for \*visual hallucinations that may occur in individuals with impaired vision. Using complexity as a guiding principle, the group of PSVP can be divided into \*phosphenes, \*photopsias, and \*formed visual hallucinations.

**Reference**

Vaphiades, M.S. (2000). Disorders of visual integration. *American Orthoptic Journal*, 50, 101–106.

**Positive Visual Aura**

see Migraine aura.

**Post-bereavement Apparition**

see Bereavement hallucination.

**Post-bereavement Hallucination**

see Bereavement hallucination.

**Postcognition**

see Retrocognition.

**Post-hypnotic Hallucination**

The term post-hypnotic hallucination is indebted to the Latin prefix *post* (after) and the notion of hypnosis, which is in turn indebted to the Greek noun *hupnos* (sleep). The term post-hypnotic hallucination is used in the literature on hypnotism to denote a hallucinatory phenomenon that can be evoked through suggestion in another person, starting – or lingering on – after the cessation of the hypnotic state. Post-hypnotic hallucinations can be either positive in nature (in which case an object or stimulus is perceived which lacks a source in the extracorporeal environment) or negative (in which case one fails to perceive an object or stimulus which is actually present in the extracorporeal environment).

**Reference**

Prince, M. (1906). Are there hypnotic hallucinations? *Journal of Abnormal Psychology*, 1, 143–146.

**Postictal Amaurosis**

A term used to denote a variant of \*amaurosis fugax (i.e. transient blindness) which is attributable to an epileptic seizure. Postictal amaurosis can affect the visual field in whole or in part. In the majority of cases, it affects only one of the hemifields. The duration of postictal amaurosis tends to be short, of the order of seconds to minutes. However, anecdotal reports describe amaurotic states lasting for minutes to



hours. Postictal amaurosis may be complicated by \*visual hallucinations. Such visual hallucinations are referred to as \*ophthalmopathic hallucinations.

### Reference

Mauguière, F. (1999). Scope and presumed mechanisms of hallucinations in partial epileptic seizures. *Epileptic Disorders*, 1, 81–91.

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## Postictal Religious Experience

The term postictal religious experience is indebted to the Latin words *post* (after) and *ictus* (thrust, blow). It is used to denote a religious experience taking place during the aftermath of an epileptic seizure. This experience may take the form of a \*religious hallucination or illusion, but this is not necessarily the case. The term postictal religious experience is used in opposition to the terms \*ictal religious experience and \*interictal religious experience.

### Reference

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## Post-image

see Afterimage.

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## Post-traumatic Flashback

Also known as revisualization. In a broad sense, the term flashback has a bearing on any experiential phenomenon that may arise either in the context of post-traumatic stress disorder (PTSD) or as a consequence of the prior use of \*hallucinogens. For the hallucinogen-related type of flashback, see the entry Flashback (drug related). In the literature on PTSD, the terms flashback and post-traumatic flashback are used to denote the \*reperception (in most instances involving a revisualization) of a trauma scene, typically in the presence of a clear sensorium. These revisualizations tend to have a realistic intensity, and to be accompanied by a high level

of emotional arousal (i.e. up to the equivalent of a panic attack). Post-traumatic flashbacks are often repetitive in nature. The affected individual may feel as if he or she is re-experiencing the prior trauma scene and lose touch with external reality. Post-traumatic flashbacks typically come and go, in the presence or absence of an environmental cue (such as a familiar smell, a violent movie scene, or the birth date of a deceased loved one) or an endogenous trigger (such as fatigue or pain). In susceptible individuals, they can be induced artificially with the aid of chemicals such as sodium lactate or a \*deliriant. Qualitatively, post-traumatic flashbacks may range from 'image memories' or 'forced recollections' to \*hallucinations proper, and the latter from \*simple to \*panoramic types of hallucinations. In some operational definitions the term post-traumatic flashback is stretched to include other PTSD symptoms as well, such as \*nightmares, \*hallucinoid experiences, \*hypnagogic and \*hypnopompic hallucinations, \*illusions, and vivid \*imagery. Post-traumatic flashbacks occurring in a different sensory modality (such as \*olfactory flashbacks) have occasionally been reported. The pathophysiology of post-traumatic flashbacks is basically unknown. It has been suggested that flashbacks may lie on a continuum with nightmares and other sleep-related disturbances, but empirical data suggest that \*dream activity and flashback activity are mutually independent perceptual phenomena. Alternatively, it has been suggested that the occurrence of flashback phenomena may be associated primarily with ongoing daytime mental imagery, intensified under the influence of the affect. It has also been suggested that post-traumatic flashbacks may be related in a conceptual as well as a phenomenological sense (and perhaps also in a pathophysiological sense) with other mnemonic events, such as drug-related flashbacks, \*hallucinogen-induced persistent perception disorder (HPPD), \*palinopsia, \*reperceptive hallucinations, \*phantom pain, \*eidetic imagery, and \*flashbulb memories. The term \*projected flashback is sometimes used to denote a flashback of an injury beyond the one that actually occurred, as reported by postoperative patients with a clinical diagnosis of PTSD. The issue of whether flashbacks in the restricted sense should be conceptualized as veridical reperceptions, or perhaps as reconstructions – or even confabulations – accompanied by a \*déjà vu-like sensation is as yet unsettled.

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**Post-traumatic Nightmare**

see Traumatic nightmare.

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**Postural Aftereffect**

A term used to denote the illusory position of the body, in part or in whole, due to a previously held position or movement. For example, when a limb is held immobile for a while, and then moved into a new position, the perceived position of that limb may be inaccurate. Postural aftereffects are classified as \*aftereffects, \*motor illusions, or \*proprioceptive hallucinations.

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**Reference**

- Jones, L.A. (1988). Motor illusions: What do they reveal about proprioception? *Psychological Bulletin*, 103, 72–86.
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**Pötzl Phenomenon**

Also written as Poetzl phenomenon. The Pötzl phenomenon involves the reappearance in \*dreams of words, images, and other types of information that were previously perceived in a subliminal way. The eponym Pötzl phenomenon refers to the Austrian neurologist and psychiatrist Otto Pötzl (1877–1962), who has been credited with describing the phenomenon in 1917.

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**Reference**

- Pötzl, O. (1917). Experimentell erregte Traumbilder in ihren Beziehungen zum indirekten Sehen. *Zeitschrift für Neurologie und Psychiatrie*, 37, 278–349.

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**Precognition**

The term precognition comes from the Latin words *pre* (before, beforehand) and *cognoscere* (learning to know). It translates loosely as ‘knowing in advance’. The term is used in parapsychology to denote the direct knowledge or perception of a future event, purportedly obtained by extrasensory means. Precognition may present in the form of ideas, associations, or intuitive feelings, as well as in the form of \*dreams or hallucinations (the latter usually being of a \*visual, \*auditory, or \*compound nature). The term precognition is used in opposition to the terms \*retrocognition and postcognition.

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**Predormital Hallucination**

see Hypnagogic hallucination.

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**Pre-lucid Dream**

A term introduced in or shortly before 1968 by the British author Celia Elizabeth Green (b. 1935) to denote a \*dream state during which the dreamer starts to wonder whether he or she is really awake, and may or may not come to the correct conclusion. Conceptually as well as phenomenologically, the pre-lucid dream is related to the \*lucid dream and to \*false awakening. As Green asserts, “It often appears to be the case that by the time it occurs to a subject to question whether he is dreaming, the dream is of such a perceptual quality as to defy the most detailed inspection. This is particularly true of that type of pre-lucid dream associated with a ‘false awakening’. This is a phenomenon which, although otherwise rare, seems to happen frequently to subjects who have completely lucid dreams as well. After a lucid dream, they may have a subsequent dream in which they seem to wake up in bed in the normal way. After some experience of this, it may occur to them to doubt whether they are really awake, and they may then proceed to

examine their environment in the hope of obtaining clues. Sometimes they do realize that this is still a dream, and another lucid dream may follow. Or, alternatively, the dream may remain pre-lucid.”

#### Reference

Green, C. (1968). *Lucid dreams*. London: Institute of Psychophysical Research.

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### Presence Hallucination

see Hallucination of presence.

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### Presomnal Sensation

see Hypnagogic hallucination.

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### Presque vu Phenomenon

*Presque vu* is French for ‘almost seen’. The term has traditionally been used to denote the subjective feeling of being on the verge of some thorough insight or epiphany. From 1928 onwards it was used by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to denote a visual experience which may arise during a mescaline intoxication, and which was described by him as follows: “The phenomena and events in the visual field point in a certain direction; that is, they suggest an end which is not quite reached, or they lack the proper completion. . . A form, a movement, a pattern, etc. is almost complete, but since it never becomes entirely completed, a highly characteristic *presque vu* experience arises.” The tantalizing sense of incompleteness that is *presque vu* is reported as being of such an overwhelming nature that subjects who experience it are inclined to attach a special or even ‘cosmic’ meaning to it. Pathophysiologically, *presque vu* experiences are associated primarily with aberrant neurophysiological activity within the temporal lobe and attributed primarily to paroxysmal neurological disorders such as migraine and temporal lobe epilepsy. *Presque vu* is conceptualized as related to the *\*dèjà* experiences. The term is used in opposition to the terms

*\*dèjà vu* (already seen) and *\*jamais vu* (never seen).

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- Critchley, M. (1949). Metamorphopsia of central origin. *Transactions of the Ophthalmologic Society of the UK*, 69, 111–121.
- Critchley, M. (1953). *The parietal lobes*. London: Edward Arnold & Co.
- Klüver, H. (1966). *Mescal and Mechanisms of hallucinations*. Chicago, IL: University of Chicago Press.

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### Pressure Phonism

The term pressure phonism is indebted to the Greek noun *phōnème*, which means voice or sound. It is used to denote a type of *\*synaesthesia* characterized by a hallucinated sound (i.e. a *\*phonism*) which is triggered by a sensation of pressure experienced on or inside the body.

#### Reference

- Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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### Pressure Phosphene

see Deformation phosphene.

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### Pressure Photism

The term pressure photism is indebted to the Greek verb *phōtizein*, which means to give light, to illuminate. It used to denote a type of *\*synaesthesia* characterized by a hallucinated colour sensation (i.e. a *\*photism*) which is triggered by a sensation of pressure experienced on or inside the body.

#### Reference

- Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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### Primitive Hallucination

A term used (and possibly also introduced) in 1930 by the German psychologists Konrad Zucker and Julius Zádor in the context of a study of \*mescaline-induced hallucinations to denote a relatively simple type of hallucination. Judging by the examples given by these authors, the notion of the primitive hallucination covers the groups of \*simple (or elementary) hallucinations and \*geometric hallucinations. Although many of their examples have a bearing on hallucinations in the visual modality, the term primitive hallucination would seem to refer to relatively simple hallucinations in the other sensory modalities as well. Zucker and Zádor use the term primitive hallucination in opposition to the term \*scenic hallucination.

#### Reference

Zucker, K., Zádor, J. (1930). Zur Analyse der Meskalin-Wirkung am Normalen. *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 127, 15–29.

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### Probing Experiments

see Cortical probing and hallucinations.

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### Projected Flashback

A term proposed in or shortly before 1988 by the American plastic surgeons Brad K. Grunert et al. to denote a type of \*flashback of physical trauma in which an injury is perceived beyond the one a person actually has.

#### Reference

Grunert, B.K., Devine, C.A., Matloub, H.S., Sanger, J.R., Yousif, N.J. (1988). Flashbacks after traumatic injuries: Prognostic indicators. *Journal of Hand Surgery*, 13, 125–127.

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### Propagated Hallucination

The term propagated hallucination is indebted to the Latin verb *propagare*, which means to trans-

mit, to spread. It is used as a generic term for hallucinations that are attributed to the propagation of aberrant activity from one CNS structure to another. A classic example of this phenomenon is \*reperception, in which aberrant activity in the hippocampus or some other limbic structure is believed to spread towards sensory cortical areas, and to thus mediate a hallucination involving the re-enactment of a past experience.

#### Reference

ffytche, D.H. (2008). The hodology of hallucinations. *Cortex*, 44, 1067–1083.

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### Proprioceptive Hallucination

Also referred to as hallucination of posture. The term proprioception comes from the Latin words *proprius* (own) and *percipere* (to perceive). It translates loosely as ‘perceiving one’s own [position]’. The term proprioception was coined in 1906 by the British neurophysiologist Charles Scott Sherrington (1857–1952) to denote the sensory modality involved with the position of body parts in space and their position in relation to each other. The term is used in opposition to the terms exteroception (denoting the group of sensory modalities that help us to receive information about the external world, such as vision, hearing, and balance), and interoception (a term used to denote the group of sensory modalities associated with the body’s internal status, including pain and sexual sensations). The German psychiatrist August Cramer (1860–1912) has been credited with publishing the first clinical study on proprioceptive as well as \*kinaesthetic hallucinations in 1889. Some examples of proprioceptive hallucinations are \*Aristotle’s illusion and the \*floating finger illusion. Proprioceptive hallucinations are sometimes classified as a subclass of the group of \*body schema illusions.

#### Reference

Cramer, A. (1889). *Die Hallucinationen im Muskelsinn bei Geisteskranken und ihre klinische Bedeutung. Ein Beitrag zur Kenntniss der Paranoia*. Freiburg: Akademische Verlagsbuchhandlung von J.C.B. Mohr.

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## Prosopometamorphopsia

Also known as metamorphopsia for faces. The term prosopometamorphopsia is indebted to the Greek words *prosōpon* (face, expression, part, mask), *metamorphoun* (to change the form), and *opsis* (seeing). It translates loosely as 'seeing faces in an altered form'. The term prosopometamorphopsia was introduced in or shortly before 1953 by the British neurologist Macdonald Critchley (1900–1997) to denote a type of \*metamorphopsia (i.e. a visual distortion) in which people's faces or specific parts thereof are perceived in a distorted manner. As to the pathophysiology of prosopometamorphopsia, it would seem likely that the visual association areas are involved, more specifically the superior temporal sulcus, and/or the fusiform face area (which is located on the right fusiform gyrus). However, it has also been suggested that the condition is attributable to higher-order cognitive impairments. Etiologically, prosopometamorphopsia is associated primarily with \*aurae occurring in the context of migraine or epilepsy (i.e. \*ictal metamorphopsia), and with the use of \*hallucinogens such as LSD and mescaline. Longer-lasting types of prosopometamorphopsia may occur in the context of structural lesions due to stroke, tumour, etc. Like other metamorphopsias, prosopometamorphopsia is classified as a \*sensory distortion.

### References

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- Nijboer, T.C.W., Ruis, C., van der Worp, H.B., de Haan, E.H.F. (2008). The role of *Funktionswandel* in metamorphopsia. *Journal of Neuropsychology*, 2, 287–300.
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## Protan Colour Blindness

see Protanopia.

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## Protan Colour Deficiency

see Protanopia.

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## Protanomaly

The term protanomaly comes from the Greek words *prōtos* (first) and *anōmalia* (anomaly, irregularity). It translates loosely as 'an irregularity in the ability to perceive the first of the primary colours (i.e. red)'. The term's introduction is generally attributed to the German ophthalmologist and physiologist Willibald A. Nagel (1870–1911). Phenomenologically, protanomaly presents in the form of a reduced sensitivity to reds. Pathophysiologically, it is associated with a diminished sensitivity of the red receptor mechanism. Protanomaly is classified as an \*anomalous trichromatism, which itself constitutes one of the \*colour vision deficiencies. The term protanomaly is used in opposition to the terms \*deutanomaly and \*tritanomaly.

### References

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- Nagel, W.A. (1898). Beiträge zur Diagnostik, Symptomatologie und Statistik der angeborenen Farbenblindheit. *Archiv für Augenheilkunde*, 38, 31–66.

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## Protanopia

Also known as protan colour deficiency and protan colour blindness. The term protanopia comes from the Greek words *prōtos* (first), *an* (not), and *opsis* (seeing). It translates roughly as 'not being able to see the first of the primary colours (i.e. red)'. It is used to denote a type of \*colour vision deficiency characterized by a loss of red sensitivity. Due to this loss of

red sensitivity, there is no perceptible difference between the colours red, orange, yellow, green, and brown, and between various shades of purple. In addition, the brightness of these colours is reduced in comparison to the brightness experienced by individuals with normal trichromasy. The term protanopia was coined in or shortly before 1837 by German physicist August L.F.W. Seebeck (1805–1849) to denote a type of colour vision deficiency in which the colour system is reduced to blue and yellow, with a shortening of the spectrum length at the red end. When the long-wavelength cones (L-cones) are missing, the term red-dichromacy protanopia is used. When these cones are present, but functioning defectively, the term \*protanomaly applies. Protanopia is inherited as a sex-linked Mendelian recessive characteristic. The term is used in opposition to the terms \*deutanopia and \*tritanopia.

### References

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- Seebeck, A. (1837). Ueber den bei manchen Personen vorkommenden Mangel an Farbensinn. *Annalen der Physik und Chemie*, 42, 177–233.

### Protéïdolie

The French term *protéïdolie* is indebted to the Greek words *prōtos* (first) and *eidos* (image, appearance, idea). It was introduced in or shortly before 1973 by the French psychiatrist Henri Ey (1900–1977) to denote a variant of \*hallucinotic eidolia (i.e. a hallucination occurring in the absence of disease) characterized by simple, yet intensely vivid images. As Ey maintains, “*Protéïdolies* [are] a variety of hallucinotic eidolias characterized by a very vivid and elementary form...and without a scenic interconnection”. Ey uses the term *protéïdolie* in opposition to the term \*phantéïdolie.

### Reference

- Ey, H. (1973). *Traité des hallucinations. Tomes 1 et 2*. Paris: Masson et Cie., Éditeurs.

### Protracted Duration

The term protracted duration is a loose translation of the German expression *Zeitlupenphänomen*, which literally means ‘time deceleration phenomenon’. The term *Zeitlupenphänomen* was introduced in or shortly before 1934 by the Austrian neurologists Otto Pöttl (1877–1962) and Hans Hoff (1897–1969). It is used to denote a significant decrease in the speed of psychological time, or the experience that time is passing more slowly than measured time would seem to suggest. Protracted duration is classified as a variant of \*tachypsychia, which is itself classified as a type of dyschronation or \*time distortion. Protracted duration is known to occur in situations characterized by extremely high or extremely low levels of overt activity. It has been described in association with extreme circumstances and events such as physical exhaustion, stress, and trauma, in the context of \*aurae preceding paroxysmal neurological disorders such as migraine and epilepsy, and following the use of psychotomimetic substances such as LSD, cannabis, and mescaline. However, protracted duration is also known to occur under physiological circumstances, especially during the execution of dull or monotonous activities. It has been suggested that the occurrence of protracted duration may be governed by neurotransmitters such as dopamine and the catecholamines. The term is used in opposition to the term \*quick-motion phenomenon, which refers to the subjective experience that time is passing quickly. It is also used in opposition to the terms \*temporal compression (i.e. a mnestic phenomenon associated with one’s experience of the past in which temporal intervals seem to have passed quickly) and synchronicity (i.e. the normal experience of lived duration). See also the entry Slow-motion hallucination.

### References

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- Hoff, H., Pöttl, O. (1934). Über eine Zeiträfferwirkung bei homonymer linksseitiger Hemianopsie. *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 151, 599–641.

Koch, C. (2004). *The quest for consciousness. A neurobiological approach*. Englewood, CO: Roberts and Company Publishers.

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## PSAS

see Persistent sexual arousal syndrome.

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## Pseudodiplopia

see Palinopsia.

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## Pseudentoptic Phenomenon

The term pseudentoptic phenomenon is indebted to the Greek words *pseudos* (untruthfulness), *entos* (inside), and *opsis* (seeing). It translates loosely as ‘a visual phenomenon that is not truly derivative from inside the eye’. The term was introduced in or shortly before 1890 by the German ophthalmologist Ludwig Laqueur (1839–1909) to denote a visual percept that arises as a consequence of an object or stimulus that is projected on the outside of the corneal surface. An example of a pseudentoptic phenomenon is the \*retinal shadow. The prefix pseudo refers to the fact that these phenomena are not attributable to a structure or process within the eye, as in \*entoptic phenomena. Laqueur refers to a book published in 1767 by the French anatomist and surgeon Claude-Nicolas Le Cat (1700–1768) as the first reference to this phenomenon.

### References

- Laqueur, L. (1890). Ueber pseudentoptische Gesichtswahrnehmungen. *Graefe's Archiv für Ophthalmologie*, 36, 62–82.
- Le Cat, C.-N. (1767). *Traité des sensations et des passions en général. Tome 1 et 2*. Paris: Vallat-La-Chapelle.

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## Pseudo-cromesthesia

The term pseudo-cromesthesia comes from the Greek words *pseudos* (untruthfulness), *chrōma* (colour), and *aisthanesthai* (to notice, to perceive). It translates roughly as ‘a phoney type of

colour perception’. The term was introduced in or shortly before 1892 by the American alienist William O. Krohn (1868–1922) as an alternative for the term colour audition (also known as \*colour hearing). As Krohn explained, “The term ‘color audition,’ so commonly used, does not cover all the cases, for there are instances. . . in which individuals have these pseudo sensations of color when they *see* words, but not when they hear them enunciated.”

### Reference

- Krohn, W.O. (1892). Pseudo-cromesthesia, or the association of colors with words, letters and sounds. *American Journal of Psychology*, 5, 20–41.

## Pseudohallucination

A term that serves as a generic name for a group of loosely defined percepts that are reminiscent of \*hallucinations proper, but fall short of one or more formal characteristics to deserve the predicate hallucination. During the era of classic psychiatry, pseudohallucinations were also referred to as *Einbildungstäuschungen* (i.e. ‘sensory miscalculations’), \*mental hallucinations, and \*apperceptive hallucinations. Today the terms \*quasi-hallucination, \*dissociative hallucination, and \*psychotic-like hallucination are sometimes used as synonyms. The term pseudohallucination was introduced in or shortly before 1868 by the German psychiatrist Friedrich Wilhelm Hagen (1814–1888), who employed it to denote a perceptual phenomenon that could be mistaken for a hallucination. The term gained a more specific connotation after its reintroduction in 1885 by the Russian psychiatrist Victor Kandinsky (1849–1889), who had experienced \*visual hallucinations himself. Elaborating upon his experience as a doctor and a patient, he used the term to designate phenomena lying within the border region between the imagination and hallucinations proper. Kandinsky defined the pseudohallucination in physiological terms as “a subjective stimulation of certain sensory cerebral areas, which evokes concrete, and very lively perceptual conceptions or perceptual images that distinguish themselves sharply from hallucinatory images to our perceiving consciousness through the lack of objectivity or realness that characterize these latter phenomena, which turns them instead into something subjective, but also something abnormal, new, something dis-

tinct from ordinary perceptual images and imaginations.” The German psychiatrist and philosopher Karl Jaspers (1883–1969), who adhered to Kandinsky’s view, emphasized their appearance in so-called inner subjective space as well as their independence of the affected individual’s conscious efforts. The Swiss psychiatrist Eugen Bleuler (1857–1939) and his son Manfred Bleuler (1903–1994) gave the term a slightly different meaning when they defined pseudohallucinations as “perceptions with full sensory clarity and a normal localization, but of which the false nature is recognized.” The Italian psychiatrist Eugenio Tanzi (1856–1934) wielded a definition that was closer to Jaspers’, but he gave it a special twist by including a clause on their alleged locus of origin which he had borrowed from his former student Ernesto Lugaro (1870–1940). As Tanzi suggested, “Pseudo-hallucinations are mental images which, instead of being evoked by external objects or by internal processes of association, arise as phantasms by the action of a local abnormal stimulus upon the representational centres.” Today pseudohallucinations are often described as hallucinations brought about by the exercise of the imagination and accompanied by the realization that the experience is not real. But the defining criteria still tend to vary somewhat from author to author, making it difficult to obtain a proper delineation of the phenomenon. Moreover, it is unclear whether hallucinating individuals are capable of discriminating these alleged phenomena from hallucinations proper. In a study performed by the Dutch hallucinations researchers Marius Romme (b. 1934) and Sandra Escher (b. 1945), this turned out to be an impossible task. Various other studies also failed to establish the validity and reliability of this distinction. As far back as 1894, the German hallucinations researcher Edmund Parish (1861–1916) expressed quite a refreshing opinion on the issue of pseudohallucinations when he said that, “Whether I see distinct and vivid images, or dim floating shapes, is a matter of no importance. The dimmest, most formless mist which I ‘see,’ or ‘think I see,’ is really seen, and even though this visual impression may have arisen subjectively, it should nevertheless be called a fallacious perception, hallucination, or illusion, quite irrespectively of how it originated, or what circumstances favoured the appearance of the phenomenon, and quite irrespectively also of its influence upon the percipient, or his attitude with regard to it.” Nevertheless, the term pseudohal-

lucination continues to be used in opposition to terms such as \*hallucination proper, \*true hallucination, and \*veridical hallucination. An alternative for the term pseudohallucination would be the term \*incomplete hallucination, which has been used since the late 19th century to denote a hallucination that lacks one or more of the formal characteristics of hallucinations proper.

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- Romme, M.A.J., Escher, A.D.M.A.C. (1994). *Accepting voices*. London: MIND Publications.

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### Pseudohallucinogen

see Hallucinogen.

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### Pseudoheautoscopy

see Out-of-body experience (OBE or OBEE).

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### Pseudopia

The term pseudopia comes from the Greek words *pseudos* (untruthfulness) and *opsis* (seeing). It was introduced by the American physician Edward Hammond Clarke (1820–1877) in a book published posthumously in 1878. Clarke used ‘pseudopia’ as an umbrella term for \*visual hallucinations, \*illusions, and delusions. As he wrote, “The normal process of vision may be appropriately called Orthopia, from ὀρθόψ and ὀπτομαί;



and false perception, or vision, Pseudopia, from *ψευδος* and *ὄπτομαι*." Clarke proposed the following detailed nomenclature of pseudopic phenomena: "According to this nomenclature, false perception, arising from the action of the intracranial visual apparatus, would be called subjective or centric pseudopia; that arising from disturbance of the eye alone, ophthalmic pseudopia; and that produced by the presence of external objects, objective or eccentric pseudopia. An individual, conscious of the error in his perceptions, would have conscious pseudopia; otherwise, unconscious pseudopia." By combining these various terms, Clarke proposed a further distinction into conscious centric pseudopia, unconscious centric pseudopia, conscious eccentric pseudopia, etc. Each of these notions was illustrated by him by means of detailed case descriptions. Clarke motivated his proposal for this new nomenclature and classification by asserting that "one advantage of these terms over the common ones of hallucination, illusion, and delusion, is that they indicate the precise part of the visual apparatus, whose structural or functional disturbance causes the false perceptions." An additional advantage for Clarke was that these terms had no traditional or preconceived connotations.

#### Reference

Clarke, E.H., Holmes, O.W. (1878). *Visions: A study of false sight (pseudopia)*. Boston, MA: Houghton, Osgood & Company.

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### Pseudo-recruitment

see Hyperacuisis.

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### Pseudosynaesthesia

The term pseudosynaesthesia comes from the Greek words *pseudos* (untruthfulness), *sun* (together, unified), and *aisthanesthai* (to notice, to perceive). It translates loosely as 'false synaesthesia'. The term is used to denote a literary or otherwise metaphorical reference reminiscent of a synaesthesia, as in the sentence "A new voice came in, a girlish voice as fresh and clear as the run of spring water over clean stones" by the American author Russell Conwell Hoban

(b. 1925). Where a person experiencing actual synaesthesias might have perceived a \*vision of spring water running over clean stones upon hearing said voice, Mr. Hoban's example is merely metaphorical.

#### References

Hoban, R. (1987). *The Medusa frequency*. London: Jonathan Cape.  
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### Pseudothalamic Pain

see Central pain.

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### Psilocin and Hallucinations

see Psilocybin and hallucinations.

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### Psilocybin and Hallucinations

The term psilocybin comes from the Greek words *psilos* (bald) and *kubè* (head). It refers to an alkaloid of the tryptamine group that can be found in no fewer than 80 species of hallucinogenic mushrooms belonging to the *Psilocybe* genus (i.e. psilocybin mushrooms, also known as magic mushrooms or Liberty Caps). In addition, psilocybin can be found in genera of mushrooms such as *Conocybe*, *Copelandia*, *Galerina*, *Gymnopilus*, *Inocybe*, *Panaeolus*, and *Pluteus*. It is a precursor for the hallucinogenic substance psilocin, which is created within the human body by means of dephosphorylation. The chemical structure of psilocin is related to that of the \*hallucinogens bufotenine and dimethyltryptamine (DMT), and to the neurotransmitter serotonin. Using the criterion of psychoactive potential as a guiding principle, psilocin is usually classified as a \*deliriant. It is believed to act as a partial agonist of 5-hydroxytryptamine or serotonin receptors. However, whether this fully explains its working mechanism is unknown. Psilocybin intoxication tends to mediate the onset of \*geometric or \*complex visual hallucinations within a few minutes after ingestion. These hallu-

inations may consist of realistic – though often distorted – persons, complex scenes, or complex geometric forms and patterns. \*Auditory hallucinations may accompany these \*visual hallucinations, which are at their peak some 2 h later. Hallucinations in the other sensory modalities may also occur, although they are reported less frequently and in no particular time sequence. \*Scenic hallucinations, \*out-of-body experiences, \*kalopsia, and \*time distortions have also been reported. A person intentionally employing psilocybin for the purpose of exploring the psyche may be called a \*psychonaut.

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## PSVP

see Positive spontaneous visual phenomena.

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## Psychalgia

see Algopsychalia.

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## Psychalia

Also known as mentalia. The term psychalia is indebted to the Greek noun *psuchè* (life breath, spirit, soul, mind). It is used to denote a mental syndrome characterized by \*auditory and \*visual hallucinations.

### Reference

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## Psychedelic

Also referred to as psychedelic drug, psychedelic substance, \*hallucinogen, hallucinogenic drug, hallucinogenic substance, magicum, pseudo-hallucinogen, illusinogen, mysticomimetic, phanerothyme, psychotic, \*psychotomimetic, \*phantasticum, and \*eideticum. The term psychedelic comes from the Greek words *psuchè* (life breath, spirit, soul, mind) and *dèlos* (visible). It translates loosely as ‘mind expanding’ or ‘mind manifesting’. It was introduced in 1956 by the British psychiatrist Humphry Fortescue Osmond (1917–2004) in a letter to the British-American writer Aldous Leonard Huxley (1894–1963), who had suggested the term phanerothyme (which is now obsolete). All the above terms are used more or less interchangeably to denote a group of chemical substances which – in relatively high doses – have the potential to alter consciousness and to evoke phenomena such as hallucinations, \*illusions, \*sensory distortions, \*delirium, loss of contact with reality, and sometimes coma and death. In 1979 the term \*entheogen was proposed as an alternative for these terms, in an effort to reinstate the original spiritual connotations of substances like these in \*mysticism and shamanism. A person intentionally employing psychedelics for the purpose of exploring the psyche may be called a \*psychonaut. For a more detailed account of this group of substances, see the entry Hallucinogen. Apart from its use as a synonym for the term hallucinogen, the term psychedelic is also used to denote a subclass of the group of hallucinogens characterized by the ability to make manifest a hidden but real memory, wish, fear, or fantasy. In the latter sense, it is used in opposition to the terms \*dissociative and \*deliriant. Some examples of psychedelics in the restricted sense are LSD, mescaline, and psilocybin. The term quasi-psychedelic is sometimes used to denote a substance with an (allegedly) low hallucinogenic potential, such as cannabis.

### References

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- Nichols, D.E. (2004). Hallucinogens. *Pharmacology & Therapeutics*, 101, 131–181.

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## Psychedelic Drug

see Psychedelic.

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## Psychedelic Hallucination

see Drug-induced hallucination.

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## Psychedelic Substance

see Psychedelic.

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## Psychic Aura

The term psychic aura comes from the Greek words *psuchè* (life breath, spirit, soul, mind) and *aura* (wind, smell). It is used to denote a type of \*aura manifesting itself either as a \*compound hallucination, a subtype of \*metamorphopsia (such as \*micropsia or \*macropsia), or an alteration in the sense of familiarity (such as derealization, \**déjà vu*, or \**jamais vu*). Etiologically, psychic auras are associated primarily with temporal lobe epilepsy and/or partial epileptic seizures affecting the limbic system. They are often accompanied by intense affective states such as fear. \*Body schema illusions and symptoms belonging to the \*Alice in Wonderland syndrome have also been reported as manifestations of psychic aura. The notion of the psychic aura is closely related to the notion of the \*ecstatic aura.

### Reference

Lüders, H., Acharya, J., Baumgartner, C., Banbadis, S., Bleasel, A., Burgess, R., Dinner, D.S., Ebner, A., Foldvary, N., Geller, E., Hamer, H., Holthausen, H., Kotagal, P., Morris, H., Meencke, H.J., Noachtar, S., Rosenow, F., Sakamoto, A., Steinhoff, B.J., Tuxhorn, I., Wyllie, E. (1998). Semiological seizure classification. *Epilepsia*, 39, 1006–1013.

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## Psychic Blindness

The term psychic blindness is indebted to the Greek noun *psuchè* (life breath, spirit, soul,

mind). It was used by the French internist Hippolyte Bernheim (1840–1919) to denote a perceptual response that may occur during hypnosis, after the hypnotized subject has been given the suggestion ‘not to see’. This response typically involves the disappearance from sight of the external environment, in favour of darkness or a formless mist. As Bernheim asserts, “Psychic blindness is the blindness which comes through imagination. It is due to the destruction of the image through psychical activity.” The expression psychic blindness is also used as a synonym for a neurological condition called \*mindblindness (i.e. visual agnosia).

### Reference

Bernheim, H. (1888). *De la suggestion et de ses applications à la thérapeutique. Deuxième édition*. Paris: Octave Doin.

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## Psychic Hallucination

Also known as psychical hallucination, mental hallucination, conception hallucination, and \*sensorial hallucination. The term psychic hallucination is indebted to the Greek noun *psuchè* (life breath, spirit, soul, mind). It was introduced in or shortly before 1846 by the French alienist Jules Gabriel François Baillarger (1806–1891) to denote a hallucination primarily mediated by mental faculties such as the memory or the imagination. Baillarger uses the term in opposition to the expression \*psychosensorial hallucination, which to him denotes a phenomenon that is more lively in nature, and attributable to the sense organs or other peripheral regions of the perceptual system. Baillarger’s notion of the psychic hallucination fits in with the \*centrifugal theory of hallucinatory activity. In 1888, the French psychiatrist Louis Jules Ernest Séglas (1856–1939) proposed a division of psychic hallucinations, or \*motor hallucinations, as he called them, into \*psychomotor hallucinations and \*verbal impulses. Séglas conceptualized psychic hallucinations as thoughts which invade the stream of conscious thought and which are designated by the affected individual as ‘alien’ (i.e. what is now known as thought insertion). The term psychical hallucination is also used by the Canadian neurosurgeon Wilder Graves Penfield (1891–1976) to denote the type of hallucination that can be evoked through cortical probing. Like Bail-

larger, Penfield envisages psychical hallucinations as mediated by central parts of the perceptual system. However, he goes one step further than Baillarger by asserting that they are invariably produced by the recall of past experience. Because of this conceptualization as \*reperceptive phenomena, Penfield suggests that psychical hallucinations should preferably be designated as experiential seizures or experiential responses to stimulation. In the context of Penfield's general classification of \*psychical states, the term psychical hallucination is used in opposition to the terms \*psychical illusion and \*psychomotor automatism.

### References

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- Penfield, W., Jasper, H. (1954). *Epilepsy and the functional anatomy of the human brain*. Boston, MA: Little, Brown and Company.
- Séglas, J. (1888). L'hallucination dans ses rapports avec la fonction du langage; – les hallucinations psycho-motrices. *Progrès Médical*, 33/34, 124–126.

illusions are alterations in the subject's interpretation of his present state, his present environment, his present existence, and differ essentially from the hallucinations, which are an awareness not of the present but of a different or previous experience." Penfield and Mullan advocate a classification of the group of psychical illusions, arranged in accordance with the sensory modality involved. Based on observations made among 217 individuals participating in cortical probing experiments, their classification comprises \*auditory illusions, \*visual illusions, \*illusions of recognition, \*illusional emotions, and a remaining group containing relatively rare phenomena such as illusions of increased awareness, illusions of alteration in the speed of movement, and visuo-vestibular disturbances.

### References

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## Psychic Pain

see Algopsychalia.

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## Psychical Illusion

Also known as illusion of comparative interpretation and interpretive illusion. The term psychical illusion is indebted to the Greek noun *psuchè* (life breath, spirit, soul, mind). It was introduced in or shortly before 1954 by the Canadian neuroscientists Wilder Graves Penfield (1891–1976) and Herbert Henri Jasper (1906–1999) to denote a misrepresentation or altered interpretation of present experience. Penfield and Jasper employ the term psychical illusion in the context of their classification of \*psychical states in opposition to the terms \*psychical hallucination and \*psychomotor automatism. As explained in a paper by Penfield and Sean Francis Mullan (b. 1925): "During a psychical illusion, a subject's awareness is altered by some change that arises spontaneously within the brain. These psychical

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## Psychical State

Also known as \*aura. The term psychical state is indebted to the Greek noun *psuchè* (life breath, spirit, soul, mind). It was introduced in or shortly before 1954 by the Canadian neuroscientists Wilder Graves Penfield (1891–1976) and Herbert Henri Jasper (1906–1999) to denote a group of hallucinatory and motor phenomena that may occur either in the wake of an epileptic seizure mediated by temporal regions of the brain, or in isolation, constituting the only clinical manifestation of an epileptic attack. These phenomena are traditionally referred to as \*aurae. Penfield and Jasper employ the term psychical state in the context of their research on epilepsy and their cortical probing experiments. A general classification of psychical states proposed by these authors comprises the notions of \*psychical hallucination, \*psychical illusion, and \*psychomotor automatism. As summarized in a 1959 paper on the subject, psychical hallucinations are conceptualized as \*reperceptive phenomena produced by the recall of past experience, whereas psychical illusions are conceptualized as misrepresentations or altered interpretations of present experience.

## References

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## Psychoactive Fauna

The term psychoactive fauna comes from the Greek noun *psuchè* (life breath, spirit, soul, mind), the Latin adjective *activus* (active), and Fauna, the name of the Roman goddess of fertility. It is used to denote the group of animals whose body parts or excretions contain one or more substances which, in a sufficiently high dose, have the potential to alter the user's state of consciousness. The existence of psychoactive fauna is less well known than that of \*psychoactive plants. And yet the utilization of animals for the purpose of obtaining hallucinatory effects dates back to ancient times. Some examples of animals with a known hallucinogenic potential are species of toads, frogs, salamanders, newts, snakes, scorpions, wasps, and fishes. For specific details on various types of psychoactive fauna see the entries Ant-ingestion and hallucinations, Bufotenine and hallucinations, Hallucinogenic salamander brandy, Dream fish, and Ichthyoalyleinotoxism. A person intentionally employing any species of psychoactive fauna for the purpose of exploring the psyche may be called a \*psychonaut.

## Reference

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## Psychoactive Plant

The term psychoactive plant comes from the Greek noun *psuchè* (life breath, spirit, soul, mind) and the Latin adjective *activus* (active). It is used as a generic term for plants which contain one or more substances which, in a sufficiently high dose, have the potential to alter the user's state of consciousness. A person intentionally employing psy-

choactive plants for the purpose of exploring the psyche may be called a \*psychonaut.

## Reference

- Rudgley, R. (1998). *The encyclopaedia of psychoactive substances*. London: Little, Brown and Company.

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## Psychoactive Substance

Also known as drug. The term psychoactive substance comes from the Greek noun *psuchè* (life breath, spirit, soul, mind) and the Latin adjective *activus* (active). It is used as a generic term for substances which, in a sufficiently high dose, have the potential to alter the user's state of consciousness. A person intentionally employing psychoactive substances for the purpose of exploring the psyche may be called a \*psychonaut.

## Reference

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## Psychogenic Anaesthesia

see Conversion anaesthesia.

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## Psychogenic Hallucination

The term psychogenic hallucination is indebted to the medical Latin term \*psychosis, which in turn comes from the Greek noun *psuchōsis* (the giving of life, the process of animating). It translates loosely as a 'hallucination created by the psyche'. The term psychogenic hallucination tends to be used quite loosely to denote a hallucination which is attributable to the brain's higher integrative centres (or the psyche, in a dualist reading). It derives from the psychological literature and tends to be used in the context of a psychodynamic interpretation of the percepts in question. Some examples of hallucinations traditionally classified as psychogenic are the \*conversive hallucination, the \*scenic hallucination, \*hallucinatory confusion, \*psychogenic pain, \*hallucinated pain, and \*algopsychalia. In

clinical practice the term psychogenic hallucination is sometimes used as more or less synonymous with \*pseudohallucination.

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## Psychogenic Pain

see Algopsychalia.

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## Psychogenic Twilight State

see Twilight state and hallucinations.

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## Psychomotor Automatism

The term psychomotor automatism comes from the Greek noun *psuchè* (life breath, spirit, soul, mind), the Latin noun *motio* (movement), and the Greek adjective *automatos* (automatically, driven by a power of its own). It was introduced in or shortly before 1954 by the Canadian neuroscientists Wilder Graves Penfield (1891–1976) and Herbert Henri Jasper (1906–1999) to denote a period of confused behaviour with amnesia. Penfield and Jasper employ the term psychomotor automatism in the context of their classification of \*psychical states in opposition to the terms \*psychical hallucination and \*psychical illusion. Psychomotor automatisms are not classified as hallucinations, but as their equivalent in the sphere of motor movements. Penfield suggests that psychomotor automatisms may be evoked by local epileptic discharge in the prefrontal or temporal cortex spreading to the diencephalon (i.e. the higher brainstem). He is careful to point out that in order to evoke an attack of automatism, the epileptic activity must be confined to the part of the diencephalon associated with consciousness, leaving the so-called automatic sensory-motor mechanism unaffected. As he asserts, “When a local discharge occurs in prefrontal or temporal areas of the cortex, it may

spread directly to the highest brain-mechanism by bombardment (the *mind's mechanism*). When it does this, it produces automatism.” And, “So it is that the mechanism in the higher brain-stem, whose action is indispensable to the very existence of consciousness, can be put out of action selectively! This converts the individual into a *mindless automaton*.” Conceptually, this explanatory model is related to Jackson's conception of the \*dreamy state. For a further explanation see the entries Automatism and Dreamy state.

### References

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## Psychomotor Hallucination

Also known as psychomotor verbal hallucination. Both terms are indebted to the Greek noun *psuchè* (life breath, spirit, soul, mind) and the Latin noun *motio* (movement). The French term *hallucination psycho-motrice* was introduced in or shortly before 1888 by the French psychiatrist Louis Jules Ernest Ségla (1856–1939) to denote an inaudible type of \*verbal hallucination. Because Ségla envisages psychomotor hallucinations as a subclass of the group of verbal hallucinations, he also refers to them as \*psychomotor verbal hallucinations (*hallucinations psycho-motrices verbales*). Conceptually, the latter term is used in opposition to the term \*auditory verbal hallucination (AVH). Ségla distinguishes three categories of psychomotor hallucinations: one in which verbal hallucinations present in the form of articulatory movements (i.e. \*motor hallucinations), one in which motor sensations accompany verbal phenomena unrecognized by the affected individual as their own (i.e. \*subvocalization), and one less circumscribed category in which the individual indicates that “I sense these words more than that I hear them” (a state of affairs that has been referred to by some as a \*pseudohallucination). Clinically as well as conceptually, it may be somewhat of a challenge to distinguish Ségla's heterogeneous group of psychomotor hallucinations from notions such as obsessive thinking, obsessive

speaking, thought insertion, and perhaps certain types of \*synaesthesia as well. After 1939, the year of Ségla's death, the notion of the psychomotor hallucination receded into the background of psychiatric conceptual thinking. Nevertheless, his work was a source of inspiration for later research on subvocalization.

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## Psychomotor Verbal Hallucination

see Psychomotor hallucination.

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## Psychonaut

The term psychonaut comes from the Greek words *psuchè* (life breath, spirit, soul, mind) and *nautès* (sailor, navigator). It translates as 'sailor of the mind' or 'navigator of the psyche'. Its origin is commonly attributed to the German author and expert on psychoactive chemicals Ernst Jünger (1895–1998). Today 'psychonaut' is used as a generic term for individuals who seek to investigate their mind using intentionally induced altered states of consciousness. The aim of this investigation may be either spiritual in nature (as in \*mysticism or \*shamanism) or of a more mundane nature (as in scientific drug experiments designed to study the effects of \*hallucinogens such as LSD, mescaline, or cannabis). The exploration of the psyche by means of techniques such as meditation, prayer, \*lucid dreaming, brainwave entrainment, \*sensory deprivation, and the use of \*hallucinogens or \*entheogens is referred to as \*psychonautics.

### Reference

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## Psychonautics

The term psychonautics comes from the Greek words *psuchè* (life breath, spirit, soul, mind) and *nautès* (sailor, navigator). It translates as (the art of) 'sailing the mind' or 'navigating the psyche'. The term, which constitutes an elaboration of the term \*psychonaut, is attributed to the Swiss-Mexican ethnobotanist Jonathan Ott. It is used to denote the exploration of the psyche by means of techniques such as meditation, prayer, \*lucid dreaming, brainwave entrainment, \*sensory deprivation, and the use of \*hallucinogens or \*entheogens. A person involved with psychonautics is called a \*psychonaut.

### Reference

- Ott, J. (2001). Pharmañopo-psychonautics: Human intranasal, sublingual, intrarectal, oral and pulmonary pharmacology of bufotenine. *Journal of Psychoactive Drugs*, 33, 273–282.

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## Psychopathology of Time Judgment

see Time distortion.

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## Psychoplasm

see Ectoplasm.

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## Psychosensorial Hallucination

The notion of the *hallucination psycho-sensorielle* was proposed in 1846 by the French alienist Jules Gabriel François Baillarger (1806–1891) to the French Academy of Medicine. Baillarger used the term to denote a type of hallucination which arises from the interplay between the sense organs and the imagination, but which is mediated primarily by the sense organs. Later the French psychologist Alfred Binet (1857–1911) proposed the term \*cerebro-sensorial hallucination to denote this class of hallucinations. Both terms have been used in opposition to the expression \*psychic hallucination (*hallucination psychique*), which refers to a type of hallucination

that is deemed to be mediated primarily by mental faculties such as memory and imagination. The notion of psychosensorial hallucinations fits in with the \*centripetal theory of hallucinatory activity, which emphasizes the role of the sense organs and the peripheral nervous system in the mediation of hallucinations. At the time, Baillarger's distinction between psychosensorial and psychic hallucinations was considered an eminent conceptual improvement over purportedly 'pure' centripetal theories such as those of the Swiss physiologist Johann Ignaz Hoppe (1811–1891) and Erasmus Darwin (1731–1802), Charles Darwin's grandfather.

### Reference

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## Psychosis

The medical Latin term psychosis comes from the Greek noun *psychōsis* (the giving of life, the process of animating). Despite its widespread use in biomedicine and psychology, it lacks a straightforward and unambiguous definition. A classical definition of psychosis was given in 1924 by the Austrian father of psychoanalysis Sigmund Freud (1856–1939) when he wrote that "*neurosis is the result of a conflict between the ego and its id, whereas psychosis is the analogous outcome of a similar disturbance in the relation between the ego and its environment (outer world).*" Many textbooks of psychiatry either provide a definition in use or simply list an overview of the operational criteria of psychosis. The more restrictive among the definitions in use regard 'psychosis' as a synonym for the group of so-called positive symptoms, which comprises hallucinations, delusions, formal thought disorders, and catatonic symptoms. Less restrictive definitions may treat psychosis as a conglomerate of positive symptoms plus negative symptoms plus affective symptoms. In an even more liberal reading, psychosis is regarded as the equivalent of a mental disorder. An additional source of confusion stems from the conceptual difference between psychotic symptoms and psychotic disorders. At the clinical level of description, it is customary to regard all hallucinations as falling into the class of psychotic symptoms. However, at the pathophysi-

ological and etiological levels of description, it is not customary to attribute all hallucinations to a psychotic disorder. As hallucinations also occur in healthy individuals, as well as in individuals with other disorders, they cannot in this sense be designated as symptoms of psychosis per se. The lack of conceptual clarity of the term psychosis has an impressive history. During the 18th century, the term was used to denote psychological, experiential states, whereas the term neurosis was used for a large group of organic affections, defined by the absence of fever and disorders of the 'general' nervous system. This pleasingly logical set of connotations (psychosis-psychological disorder, neurosis-neurological disorder) was somehow lost during the process of medicalization. As the British historian of psychiatry German E. Berrios relates, "The two terms underwent major changes in meaning during the 19th century. By 1900 the membership of the class neuroses had been drastically reduced and its few members redefined as 'psychological' disorders; in contradistinction to this, the 'psychoses' came to encompass an ever growing class of disorders, whose common denominator was the claim that they were 'organic' in nature." The Austrian philosopher Ernst Freiherr von Feuchtersleben (1806–1849) has been credited with being the first – in 1845 – to devise a classification in which the psychoses were distinguished from the diseases of the nerves. As the term in its current use refers neither to the psychological nature nor to the alleged organic nature of the phenomena in question, the need for a proper definition would seem to be more urgent than ever.

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Von Feuchtersleben, E. (1845). *Lehrbuch der ärztlichen Seelenkunde*. Wien: Verlag von Carl Gerold.

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## Psychostimulants and Hallucinations

see Stimulant psychosis and hallucinations.

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## Psychotherapy and Hallucinations

While it is true that hallucinations often come and go at their own pace, clinical practice indicates that this is not a hard and fast rule. On the basis of that empirical finding, a range of practical courses have been developed that teach individuals how to gain a certain degree of control over their hallucinations, and how to 'zap' those with a negative content. The effectiveness of these methods has been documented extensively. Although the results are not univocal, the studies do indicate that the frequency, duration, and content of hallucinations are more amenable to conscious control than has traditionally been assumed. See also the entry Cognitive therapy and hallucinations.

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## Psychotic

see Hallucinogen.

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## Psychotic Hallucination

The term psychotic hallucination is indebted to the medical Latin term \*psychosis, which in turn stems from the Greek noun *psychōsis* (the giving of life, the process of animating). It is used to denote a hallucination which is attributable to an

underlying \*psychotic process or disorder. The term psychotic hallucination is used in opposition to terms such as \*conversive hallucination (i.e. a hallucination that is attributable to \*sensory conversion), \*dissociative hallucination (one that is attributable to \*dissociation), \*organic hallucinosis (a hallucinatory state that is attributable to a \*somatic condition), and \*psychotic-like hallucination (a percept that is reminiscent of a \*hallucination proper, but lacks one or more of the necessary formal characteristics). Conceptually, the term psychotic hallucination is not unambiguous. One reason for this is that at the clinical level of description all hallucinations may be considered psychotic phenomena. As used in the term psychotic hallucination, however, the adjective psychotic refers to a causative level of description. This makes the term even more problematic, since pathophysiological notions such as psychosis, conversion, and dissociation are rather poorly validated, as is their relation to organic disease. Moreover, some studies suggest that the conceptual distinction between these purported mechanisms is not corroborated by the phenomenological characteristics of the ensuing types of hallucinations. For a discussion of this latter issue, see the entry Borderline personality disorder (BPD) and hallucinations.

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## Psychotic-Like Hallucination

The term psychotic-like hallucination is indebted to the medical Latin term \*psychosis, which in turn stems from the Greek noun *psychōsis* (the giving of life, the process of animating). It is used more or less interchangeably with terms such as \*pseudohallucination, \*quasi-hallucination, and \*dissociative hallucination. All these terms are used to express the observation that the phenomenon in question is reminiscent of a \*hallucination proper, but that it lacks one or more of the latter's formal characteristics. The

term psychotic-like hallucination is used in opposition to terms such as hallucination proper, \*true hallucination, \*veridical hallucination, and \*psychotic hallucination.

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### Psychotomimetic

Also known as psychotic, \*hallucinogen, hallucinogenic drug, hallucinogenic substance, magicum, pseudohallucinogen, illusinogen, mysticomimetic, phanerothyme, \*phantasticum, \*eideticum, \*psychedelic, psychedelic drug, and psychedelic substance. The term psychotomimetic is indebted to the medical Latin term \*psychosis, which in turn stems from the Greek noun *psychōsis* (the giving of life, the process of animating, breathing life into), and to *mimēsis* (the mimicking). It translates loosely as ‘imitator of psychosis’. The term psychotomimetic was introduced in or shortly before 1957 by the British psychiatrist Humphry Fortescue Osmond (1917–2004). It is used more or less interchangeably with the other terms above to denote a group of chemical substances which – in relatively high doses – have the potential to alter consciousness and to evoke phenomena such as hallucinations, illusions, \*sensory distortions, \*delirium, loss of contact with reality, and sometimes coma and death. In 1979 the term \*entheogen was proposed as an alternative for these terms, in an effort to reinstate the original spiritual connotations of substances like these in \*mysticism and shamanism. A person intentionally employing psychotomimetics for the purpose of exploring the psyche may be called a \*psychonaut. For a more detailed account of this group of substances, see the entry Hallucinogen.

### References

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### Pulsatile Tinnitus

Also known as pulsing tinnitus. Both terms are indebted to the Latin verb *pulsare*, which means to hit, to knock, to pulsate. They are used to denote a type of \*tinnitus (i.e. ‘ringing in the ears’) characterized by a rhythmic sound that can be heard not only by the individual affected but also by others, either with the aid of a stethoscope placed in a location around the ear, or – without any artificial aids – as emanating from the affected individual’s ear. Pulsatile tinnitus is classified as a type of \*objective tinnitus. Its incidence is relatively low. In a survey among 2,838 individuals with a clinical diagnosis of tinnitus, only 3.4% had pulsatile tinnitus. The condition is not necessarily accompanied by hearing loss. Pathophysiologically, pulsatile tinnitus is associated primarily with a variety of muscular and vascular mechanisms. The muscular types are generally attributed to degenerative diseases of the head and neck, such as amyotrophic lateral sclerosis (ALS), in which loss of neuromuscular control may result in a repetitive flutter or myoclonus of the stapedius or the tensor tympani muscles. This may entail an audible flutter emanating from the ear. A rare cause of the muscular type of tinnitus is palatal myoclonus, a condition attributed to rhythmic discharges from the brainstem’s inferior olivary nucleus. Such discharges are attributed to focal epileptic activity, which may in turn be caused by conditions such as stroke, trauma, encephalitis, multiple sclerosis, a local vascular malformation, or a degenerative disease. The vascular types of pulsatile tinnitus may be due, for example, to tortuosity of the carotid artery, the jugular bulb, or the jugular vein. This tortuosity may entail intravascular turbulence, perceived by the affected individual as a rhythmically vibrating, or low-pitched sound, rather than a ringing or clicking sound. Other medical conditions associated with an increased relative risk for pulsatile tinnitus include hypertension, intracranial hypertension syndrome, glomus tumours, and neurovascular compression of the acoustic nerve.

## References

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## Pulsation Phenomenon

The term pulsation phenomenon is indebted to the Latin verb *pulsare*, which means to hit, to knock, to pulsate. It is used to denote the repeated \*magnification or \*minification of visually perceived objects. The pulsation phenomenon has been described as a special quality of \*macropsia and \*micropsia occurring in the context of \*migraine aura. The cycle of pulsation (i.e. from the onset of the object's apparent increase or decrease in size until the return to its proper size) tends to be of the order of 10 s. When macropic or microptic vision sets in more gradually, it is referred to as \*zoom vision. The pulsation phenomenon has also been described in relation to a recurrent dimness of vision. In the latter case, visually perceived stimuli are gradually replaced by a uniform greyness, to then reappear at a faster pace.

## Reference

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## Pulsing Tinnitus

see Pulsatile tinnitus.

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## Punctum Caecum

see Blind spot.

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## Punktschwanken

see Autokinetic effect.

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## Purkinje Afterimage

Also referred to as Purkinje image and \*Bidwell's ghost. The eponym Purkinje afterimage refers to the Bohemian physiologist Johannes Evangelista Purkyně (1787–1869). It is used to denote a \*negative afterimage that appears secondly in a temporal sequence of \*afterimages resulting from a brief light stimulus. Purkinje afterimages appear in a hue complementary to that of the original optical stimulus. The term is used in opposition to \*Hering's afterimage (which is the first in the temporal sequence of afterimages) and \*Hess afterimage (i.e. the third in this sequence). The Purkinje afterimage is usually classified as a \*physiological illusion.

## Reference

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**Fig. 2** Johannes Evangelista Purkyně

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## Purkinje Effect

Also known as Purkinje shift. Both eponyms refer to the Bohemian physiologist Johannes Evangelista Purkyně (1787–1869). They are used to denote the physiological phenomenon that at dusk, when the light intensity gradually decreases, the colours red and yellow are perceived to fade faster than blue and violet – that is to say, when said colours are of a comparable brightness. Physiologically, this difference is attributed to the retina's rods being more sensitive to short wavelengths than to long wavelengths. The Purkinje effect is usually classified as a \*physiological illusion.

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## Purkinje Figure

Also known as Purkyně figure. Both eponyms refer to the Bohemian physiologist Johannes Evangelista Purkyně (1787–1869). They are used to denote an \*entoptic phenomenon consisting of a black, tree-like structure that can be made visible under physiological circumstances by shining light onto the eyeball, preferably in a darkened room, at an oblique angle, through a pinhole held close to the cornea. The mediation of the Purkinje figure is attributed to the effects of the network of blood vessels overlying the retina. The Purkinje figure should not be confused with the notions of \*dendropsia, \*Purkinje afterimage, \*Purkinje effect, \*Purkinje phenomenon, and \*Purkinje's colour.

### Reference

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## Purkinje Hallucination

see Purkinje's colour.

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## Purkinje Image

see Purkinje afterimage.

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## Purkinje Phenomenon

see Purkinje's colour.

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## Purkinje Shift

see Purkinje effect.

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## Purkinje's Colour

Also known as Purkinje phenomenon, Purkinje hallucination, flicker-induced hallucination, and \*photically induced hallucination. The eponyms Purkinje's colour, Purkinje hallucination, and Purkinje phenomenon refer to the Bohemian physiologist Johannes Evangelista Purkyně (1787–1869), who has been credited with describing the phenomenon in 1819 after having discovered it during his childhood. Phenomenologically, Purkinje's colour is characterized by \*simple and \*geometric visual hallucinations consisting of patterns, motion, and colour, which can be induced by photic stimulation. This can be done with the aid of a stroboscope or simply by facing the Sun with closed eyes, and waving one's slightly separated fingers up and down in front of the eyelids. Purkinje's colours tend to set in a few second after the start of photic stimulation. Its neurophysiological correlates are believed to lie primarily in the occipital cortex, where repetitive light flashes tend to induce widespread activity which may or may not result in subsequent hallucinatory activity.

### References

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Purkinje, J.E. (1819). *Beobachtungen und Versuche zur Physiologie der Sinne: Beiträge zur Kenntniss des Sehens in subjectiver Hinsicht*. Prague: Calve.

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**Purple Vision**

see Ianothinopsia.

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# Q

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## Qat-induced Hallucination

The name qat is also spelled as quat, khat, chat, cat, kat, and kaht. All names stem from *qāt*, which is the Arabic name for *Catha edulis Forskall*, an evergreen shrub indigenous to north-east African countries and the Arabic peninsula, where it has been used at least since the 12th century. Qat tends to be classified as a mild CNS stimulant or a minor \*hallucinogen. To obtain the stimulant effects of qat, the leaves and/or other parts of *C. edulis* are chewed or infused to make a tea. The plant's psychoactive properties are attributed to the alkaloids cathenine, cathedine (A, B, C, and D), cathinone, and cathine. Cathine, or norpseuodophedrine, in particular, has long been held responsible for the induction of stimulant effects such as euphoria, mental alertness, suppression of appetite, and a diminished need for sleep. However, on the basis of more recent studies it has been suggested that cathinone, a compound structurally related to D-amphetamine, may be even more important in producing these effects. The aftereffects of qat consumption include physical fatigue, apathy, anorexia, irritability, mild paranoia, and mild depression. The most common type of hallucination reported by qat users is \*formication, i.e. a \*tactile hallucination of bugs swarming on or beneath the skin, as in \*cocaine bugs. Qat users tend to attribute this type of hallucination to the use of relatively cheap – yet strong – varieties of qat. Occasionally, qat intoxication induces amphetamine-like \*psychotic symptoms

such as \*visual and \*auditory hallucinations, excitation, disorientation, and formal thought disorder. A group headed by the American psychiatrist and anthropologist John G. Kennedy, who studied the effects of qat in North Yemen, found that 50–60% of the women and 80–85% of the men chew qat at least once a week. In their study sample, 30% of the habitual users reported having experienced hallucinations on at least one occasion. Chronic psychotic states induced by qat were virtually unknown. A person intentionally employing qat for the purpose of exploring the psyche may be called a \*psychonaut.

### References

- Kennedy, J.G. (1987). *The flower of paradise. The institutionalized use of the drug qat in North Yemen*. Dordrecht: D. Reidel Publishing Company.
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## Quadrantanopsia and Hallucinations

The term quadrantanopsia comes from the Latin noun *quadrans* (the quarter part of a circle), and the Greek words *an* (not) and *opsis* (seeing). It translates as 'blindness within a quarter of the field of vision'. Quadrantanopsia is attributed either to discrete lesions of the occipital cortex or to lesions of the optic radiations. Amaurosis in the upper quadrant is associated with lesions

to the inferotemporal segment of the optic radiations, whereas amaurosis in the lower quadrant is associated with lesions to the temporoparietal segment. In either case the central field of vision tends to remain intact. Occasionally quadrantanopsia is complicated by \*visual hallucinations within the amaurotic quarter field of vision. In individual cases it is generally possible to determine the cause of quadrantanopsia through ophthalmologic and neurologic examination, and with the aid of localizing techniques such as EEG or MRI. But whether the lesions which can thus be demonstrated are also responsible for mediating the hallucinatory activity is as yet unclear. The literature contains various case reports involving simple, stereotypical visual hallucinations that might well be mediated by the discrete lesions that were held responsible for the quadrantanopsia. However, \*complex visual hallucinations and even \*compound hallucinations have also been reported. For a further discussion of this type of visual hallucination, see the entries Ophthalmopathic hallucination, Hemianopic hallucination, and Charles Bonnet syndrome.

### References

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- Freiman, Th.M., Surges, R., Vougioukas, V.I., Hubbe, U., Talazko, J., Zentner, J., Honegger, J., Schulze-Bonhage, A. (2004). Complex visual hallucinations (Charles Bonnet syndrome) in visual field defects following cerebral surgery. Report of four cases. *Journal of Neurosurgery*, 101, 846–853.

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## Qualia Theory of Hallucinations

The term qualia theory is indebted to the Latin term *qualia*, which is plural for the singular *quale*; it translates as ‘qualities’. The term qualia theory is used by the British philosopher Tim Crane to denote any philosophical theory that puts the subjective qualitative properties of hallucinations on a par with those of regular sense perceptions, arguing that the final common pathway of both types of perception involves the instantiation of qualia. As used in philosophy, the term qualia refers to the subjective qualities of conscious

experience. Examples of qualia are the redness of red apples, the way honey tastes, the way lovesickness feels, and the way a diesel engine sounds. The term qualia theory is used in opposition to the term disjunctivist theory or \*disjunctivism. In conformity with the empiricist philosophy of John Locke (1632–1704), and contrary to the disjunctivist theory, the qualia theory suggests that sense perceptions and subjectively indistinguishable hallucinations are states of the same fundamental psychological kind, because both types of perception ultimately depend on the instantiation of qualia. An important advantage of the qualia theory is that it is compatible with current neuroscientific hypotheses involving the role of the perceptual system in the mediation of both hallucinatory and sensory percepts. As suggested by the American neuroscientists Rodolfo Riascos Llinás (b. 1934) and Urs Ribary, both hallucinations and sense perceptions may be considered closed, intrinsic functional states of the thalamocortical system. The qualia theory fits in well with this hypothesis, as both positions emphasize the view that mind-independent objects as such cannot be perceived, and that instead we perceive endogenously mediated qualia, irrespective of their true origin from inside or outside the brain (or mind, in a dualist reading). An important disadvantage of the qualia theory is that it compromises the status of regular sense perceptions. After all, if there are no intrinsic qualitative differences between sense perceptions and hallucinations, how are we to tell the difference between the two types of percepts? A post hoc solution to this problem can be found in the work of the British psychiatrists Ralph-Peter Behrendt and Claire Young, who suggest that the senses exert a restraining influence upon the number of degrees of freedom of the thalamo-cortical system’s spontaneous (hallucinatory) activity. A consequent elaboration of this line of thought entails the view that all our percepts are hallucinations, and that sense perceptions have the status of hallucinations that are merely modulated or restrained by the senses. Or, as the French critic and historian Hippolyte Taine (1828–1893) put it as far back as 1870, that sense perceptions are true hallucinations (*La perception est une hallucination vraie*).

### References

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## Quasi-Hallucination

A term that tends to be used quite loosely to denote a percept that is reminiscent of a \*hallucination proper, but lacks one or more of the latter's formal characteristics. The term quasi-hallucination is often used interchangeably with terms such as \*dissociative hallucination, \*pseudohallucination, and \*psychotic-like hallucination. All four terms are used in opposition to terms such as \*hallucination proper, \*true hallucination, and \*veridical hallucination.

### Reference

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## Quaternary Bow

see Rainbow.

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## Quick-motion Phenomenon

Also known as time-grabbing phenomenon. The term quick-motion phenomenon is a loose translation of the German expression *Zeitrafferphänomen*, literally 'time shortening phenomenon' or 'time abridgement phenomenon'. The term *Zeitrafferphänomen* was introduced in or shortly before 1934 by the Austrian neurologists Otto Pözl (1877–1962) and Hans Hoff (1897–1969). It is used to denote a rare variant of \*tachypsychia (which is itself classified as a type of \*time distortion) in which psychological time is significantly speeded up. As a result, time seems to pass too quickly, and people

and objects are perceived as if rushing about at an extraordinary speed. The quick-motion phenomenon has been described chiefly with reference to the visual modality, but it can also affect the auditory modality. In the latter case, people may seem to be talking too fast and too loud, in high-pitched voices, like an audio tape played at fast forward. The accompanying sensation that one's own movements are slowing down is called a \*slow-motion hallucination. The quick-motion phenomenon was described as early as 1917 in an 8-year-old boy with fever by a German psychiatrist called Klien. Historically, the phenomenon has been associated primarily with temporal lobe dysfunction. However, emerging empirical evidence would seem to indicate that the neurobiological correlates of time perception are located within an extensive network that includes the right parietal lobe, the basal ganglia, and the cerebellum. Etiologically, the quick-motion phenomenon is associated primarily with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy, the \*Alice in Wonderland syndrome, and the use of psychotomimetic substances such as cannabis, LSD, and mescaline. The term quick-motion phenomenon is used in opposition to the terms slow-motion hallucination and \*protracted duration. It should not be confused with the notions of \*akinetopsia and \*cinematographic vision, which denote conditions in which the ability to perceive movement is lacking, and moving objects are therefore perceived in the form of a series of 'stills'. Nor should it be confused with the notion of \*temporal compression, which refers to the retrospective sensation that time has passed too quickly.

### References

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# R

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## Rabbit-Duck

see Jastrow's duck-rabbit.

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## Rabbit-Duck Illusion

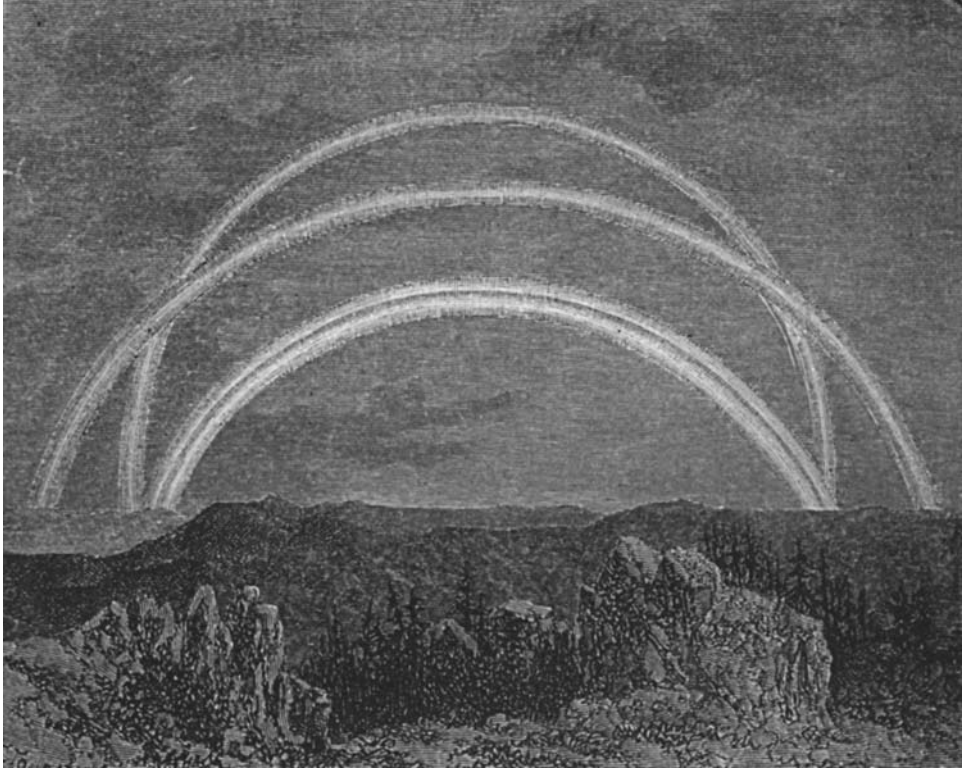
see Jastrow's duck-rabbit.

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## Rainbow

A term used to denote the well-known coloured arc sometimes seen against a sunlit background of falling water drops. Rainbows are typically seen when the Sun is low in the sky, and the observer is facing a raincloud on the horizon opposite the Sun (i.e. at the antisolar point). When more than one rainbow is visible (i.e. a double rainbow), the inner, brighter one is called the primary bow and the outer, fainter one the secondary bow. Primary rainbows are coloured blue to red outwards from the antisolar point, whereas the colours of secondary rainbows are reversed, i.e. red to blue outwards from the antisolar point. The relatively dark area in between the primary and secondary bows is called Alexander's band or Alexander's dark band, after the Greek philosopher Alexander of Aphrodisias (c. AD 200). Sometimes a third or 'supernumerary' bow

can be seen inside the primary bow or outside the secondary bow. Supernumerary bows tend to be even fainter than secondary bows. Still fainter bows, such as quaternary bows, can be produced experimentally by the laser illumination of single droplets. It is believed that they also occur in nature but that they are seldom observed because of their extremely low visibility. The colours of all rainbows extend beyond the visible colours towards infrared and ultraviolet. The brightness of the colours perceived depends on various factors, such as the strength and hue of the sunlight, the size of the water drops, the number of reflections inside the water drops, and the colour of the background against which the rainbow is seen. The brightest result is obtained with low, bright sunlight, relatively large water drops, a single internal reflection, and a dark-coloured background. Reddish sunlight, seen around the moment of sunset or dawn, may produce a red rainbow. When a rainbow is produced by moonlight, the term lunar bow is used. Lunar bows tend to be colourless. They should not be confused with the white rainbow or \*Ulloa circle. Other types of rainbow include the surf bow (seen in the spray of crashing waves at the beach), the swimmer's bow (seen by swimmers at less than a metre away in the spray they produce), the road spray bow (seen in spattering water from puddles on the road), the marine bow (seen at the prow of a ship), the reflection rainbow (created by sunlight that is first reflected in water), the garden hose bow, the geyser bow, and the mist bow. All types of rainbow are classified as \*physical illusions. They are attributed to the refraction



**Fig. 1** Triple rainbow. Source: Flammarion, C. (1873). *The atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

and reflection of sunlight by water drops. Because of their lack of a tangible substratum in the extracorporeal world, they are also referred to as \*fiction illusions.

#### References

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representation, shadow. It is used to denote a relatively rare \*fortification spectrum (i.e. a \*scintillating scotoma) which may occur in the context of a \*migraine aura. The rainbow spectrum appears as an arc that is placed centrally and bilaterally in the visual field. It is classified as a \*bilateral spectrum. Along with various other bilateral spectra, it was first described in 1904 by the British neurologist Sir William Richard Gowers (1845–1915). However, it has been speculated that the classical physician Aretaeus of Cappadocia (c. AD 150) refers to the same phenomenon in one of his medical writings. As the involvement of both hemifields in fortification spectra is extremely rare, and cannot be explained with recourse to current hypotheses involving the mediation of these phenomena in a single cerebral hemisphere, the British neurologist Oliver Wolf Sacks (b. 1933) notes that “the existence of such scotomata poses very difficult problems to those

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### Rainbow Spectrum

The term rainbow spectrum comes from the Latin noun *spectrum*, which means image,



**Fig. 2** Rainbow spectrum. Source: Gowers, W.R. (1904). *Subjective sensations of sight and sound: Abiotrophy, and other lectures*. Philadelphia, PA: P. Blakiston's Son & Co

who postulate a local, unilateral process as the basis of migraine auras.”

#### References

- Gowers, W.R. (1904). *Subjective sensations of sight and sound: Abiotrophy, and other lectures*. Philadelphia, PA: P. Blakiston's Son & Co.  
 Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.

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### Raudive Voices

see Electronic voice phenomenon (EVP).

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### Ravel, Joseph-Marie (1875–1937)

A Basque French composer and pianist of the impressionistic period who later in life suffered from apraxia and aphasia due to an unknown

neurodegenerative disease. Ravel's reports of “hearing music in his head” have been interpreted by some authors as \*musical hallucinations.

#### Reference

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### Reading Echo

see Echo of reading.

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### Reduced Synaptic Connectivity Model of Hallucinations

The name of a hypothetical model designed to explain the mediation of \*verbal auditory hallucinations and certain other types of hallucination. In this model a central role is attributed to excessive synaptic pruning in the CNS. Notably, excessive eliminations of cortico-cortical connections have been mentioned as advantageous to the occurrence of hallucinations, whether or not in combination with compensatory alterations in dopaminergic activity.

#### Reference

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### Red Vision

see Erythroptasia.

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### Reduplication of the Phantom

see Supernumerary phantom limb.

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### Reduplication Syndrome

see Misidentification syndrome.

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## Reduplicative Hallucination

The term reduplicative hallucination is indebted to the Latin noun *reduplicare*, which means to double. It is used as an umbrella term for hallucinations depicting a mirror image or reduplication of oneself, as is the case in \*autoscopy, \*heautoscopy, \*out-of-body experience (OBE), \*doppelgänger phenomena, and \*specular hallucinations.

### Reference

Brugger, P., Regard, M., Landis, Th. (1997). Illusory reduplication of one's own body: Phenomenology and classification of auto-scopic phenomena. *Cognitive Neuropsychiatry*, 2, 19–38.

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## Reduplicative Phenomenon

The term reduplicative phenomenon is indebted to the Latin noun *reduplicare*, which means to double. It is used as an umbrella term for a group of illusory perceptual phenomena characterized by the perseveration, reduplication, or reoccurrence of regular sense perceptions. Some examples of reduplicative phenomena are \*visual perseveration (comprising the subgroups \*illusory visual spread, \*palinopsia, and the \*trailing phenomenon), \*palinacsis, \*tactile polyesthesia, \*polyopia, and \*entomopia.

### Reference

Critchley, M. (1953). *The parietal lobes*. London: Edward Arnold & Co.

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## Reed's Definition of Hallucinations

In 1972 the Canadian psychologist Graham F. Reed (1923–1989) defined hallucinations as follows: "Hallucination involves the perceptual reconstruction of stored material and its misinterpretation in terms of output."

### Reference

Reed, G. (1972). *The psychology of anomalous experience. A cognitive approach*. London: Hutchinson & Co.

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## Reed's Definition of Illusions

In 1972 the Canadian psychologist Graham F. Reed (1923–1989) defined illusions as follows: "Illusion involves the misinterpretation of input in terms of its synthesis with stored material."

### Reference

Reed, G. (1972). *The psychology of anomalous experience. A cognitive approach*. London: Hutchinson & Co.

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## Re-entrant Signal

see Reperception.

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## Reflection Rainbow

see Rainbow.

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## Reflex False Perception

A term used by the Swiss psychiatrist, hypnotist, and entomologist August Forel (1848–1931) as a synonym for \*reflex hallucination. As Forel wrote in 1903, "By *reflex false perception* we mean false perceptions of one sense which are called forth by normal perceptions of another. Thus one of my patients always felt blows from a stick when some one rattled the key in the door." Although closely related in a phenomenological sense, the reflex false perception should not be confused with \*synaesthesia.

### Reference

Forel, A. (1907). *The hygiene of nerves and mind in health and disease*. Translated by Aikins, H.A. New York, NY: The Classics of Psychiatry & Behavioral Sciences Library.

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## Reflex Hallucination

Also known as \*reflex false perception and \*apperceptive hallucination. The German term

*Reflexhallucination* was introduced in or shortly before 1866 by the German psychiatrist Karl Ludwig Kahlbaum (1828–1899) to denote a hallucination arising in reaction to a regular sense impression that affects a different sensory modality. In his treatise on hysteria, the French philosopher and hypnotist Pierre Marie Félix Janet (1859–1947) illustrates the phenomenon by giving the example of a woman named Berthe who is told, during a somnambulist state, that she will see a butterfly whenever her thumb is touched and a goose whenever her pink is touched – which she does accordingly. The Swiss psychiatrist Eugen Bleuler (1857–1939) likened the mediation of reflex hallucinations to the regular process of association when he wrote that “reflex hallucinations. . . may originate by way of exaggeration of a normal process: the sight of a handwriting or the hearing of footsteps may often arouse very vivid feelings and even definite ideas.” A variant of the reflex hallucination is known as \*creative hallucination. Conceptually and phenomenologically, there would seem to be a certain analogy between reflex hallucinations and \*synaesthesias. However, synaesthesias tend to be conceptualized as stereotyped and relatively simple perceptual phenomena that manifest themselves in a sensory modality other than the one that was stimulated, whereas reflex hallucinations can affect any of the sensory modalities, ranging in complexity from simple to complex, and even compound. Nevertheless, the terms synaesthesia and reflex hallucination are sometimes used interchangeably in the literature. Conceptually, the notion of the reflex hallucination also shows certain similarities to other cross-activation syndromes such as the \*Tullio phenomenon and the Proust phenomenon (involving odours evoking autobiographical memories, named after the French author Marcel Proust (1871–1922)).

### References

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- Kahlbaum, K. (1866). Die Sinnesdelirien. *Allgemeine Zeitschrift für Psychiatrie und psychisch-gerichtliche Medizin*, 23, 56–78.

### Reflex Polysynaesthetic Hallucinosi

A term coined in or shortly before 2005 by the British psychiatrists Anna Goel and Francis James Eva to denote a \*synaesthetic hallucination elicited by a single sensory stimulus and manifesting itself in more than one sensory modality.

### Reference

- Goel, A., Eva, F.J. (2005). Reflex polysynaesthetic hallucinosi in a man with schizophrenia. *Progression in Neurology and Psychiatry*, 9, 36–40.

### Reid, Thomas (1710–1796)

A Scottish philosopher, parish minister, and astronomer, who is renowned for his criticism of David Hume (1711–1776). Reid is sometimes referred to as the first person to describe a case of \*metamorphopsia. Reportedly, he himself contracted the condition in 1764 after a period of sunbathing.



**Fig. 3** Thomas Reid. Copy of an oil painting by Henry Raeburn

**References**

- Reid, Th. (1818). *An inquiry into the human mind, on the principles of common sense*. Edinburgh: Anderson and MacDowall.
- Wood, P.B. (1985). *Thomas Reid and the Scottish Enlightenment*. Toronto: Thomas Fischer Rare Book Library.

**Relative Hemianopia**

see Visual inattention.

**Release Form of Hallucinatory Experience**

A term introduced in or shortly before 1973 by the American ophthalmologist David Glendenning Cogan (1908–1993) to denote a type of hallucinatory activity which is due to the release of perceptual material from ‘lower’ regions of the brain. Cogan opposes this type of hallucinatory activity to the \*irritative form, in which hallucinations arise from local epileptiform (or irritative) activity. For a further explanation of the release model, see the entry Perceptual release theory of hallucinations.

**Reference**

- Cogan, D.G. (1973). Visual hallucinations as release phenomena. *Albrecht von Graefes Archiv für Klinische und Experimentelle Ophthalmologie*, 188, 139–150.

**Release Hallucination**

A term used to denote a hallucination attributable to \*perceptual release or ‘dream intrusion’. For a further explanation of this hypothetical model, see the entry Perceptual release theory of hallucinations.

**Reference**

- West, L.J., ed. (1962). *Hallucinations*. New York, NY: Grune & Stratton.

**Religious Hallucination**

A term used to denote a hallucination which either contains religious symbols or is associated

with religious beliefs. See also the entries Ictal religious experience, Interictal religious experience, and Postictal religious experience.

**References**

- Goodman, F.D., Henney, J.H., Pressel, E. (1982). *Trance, healing, and hallucination. Three field studies in religious experience*. Malabar, FL: Robert E. Krieger Publishing Company.
- Weinstein, E.A. (1962). *Social aspects of hallucinations*. In: *Hallucinations*. Edited by West, L.J. New York, NY: Grune & Stratton.

**REM Anxiety Dream**

see Nightmare.

**REM Dissociation Phenomenon**

see Hypnagogic hallucination.

**REM Dream**

The acronym REM dream stands for rapid eye movement dream. It is used to denote a \*dream occurring during REM sleep. Dreams may also occur during non-rapid eye movement (NREM) sleep, but this is believed to happen less frequently. Physiologically, REM dreams are associated primarily with increased neurophysiological activity in specialized sensory cortical areas, in the limbic cortex, the pedunculus cerebri, and the thalamus.

**Reference**

- Hartmann, E. (1998). *Dreams and nightmares. The new theory on the origin and meaning of dreams*. New York, NY: Plenum Trade.

**Remote Perception**

see Remote viewing.

**Remote Sensing**

see Remote viewing.

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## Remote Viewing

Also known as remote sensing, remote perception, extrasensory perception, telesthesia, and travelling clairvoyance. The term remote viewing was introduced in 1974 by the American physicist and parapsychologist Harold E. Puthoff (b. 1936) and the American physicist Russell Targ (b. 1934) to denote the act of perceiving a remote or hidden object without support of the senses or any technical aids such as a radio or a computer. Puthoff and Targ's experiments with remote viewing from the 1970s through 1995 were carried out in the context of the CIA's Stargate programme, which was designed to evaluate the usefulness of this parapsychological phenomenon for intelligence purposes. The experiments were conducted under the auspices of the Stanford Research Institute in Menlo Park, California. As a phenomenon, remote viewing has been described since ancient times. The resulting percepts, which may reportedly occur in any of the sensory modalities, are designated either as \*telepathic, \*coincidental, or \*veridical hallucinations.

### References

- Gully, R.E. (1991). *Harper's encyclopedia of mystical and paranormal experience*. New York, NY: Castle Books.
- Targ, R., Puthoff, H.E. (1974). Information transfer under conditions of sensory shielding. *Nature*, 252, 602–607.

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## Reperception Model of Hallucinations

Reperception is also known as downward sensory impulse, top-down signal, re-entrant signal, and feedback signal. The reperception model is an explanatory model of hallucinatory activity which designates hallucinations as reperceptions or re-enactments of previously perceived scenes, objects, or stimuli. It locates the primary source of hallucinatory activity in the limbic system and/or sensory cortical areas. One of the major advantages of present-day reperception models is their ability to account for \*compound hallucinations that have the full experiential saturation of sense perceptions. The weaker versions appear to include quasi-realistic, dreamlike phenomena in waking subjects as well. A variant of the reperception model, used as an explanatory model for the

mediation of \*musical hallucinations, is known as the \*parasitic memory hypothesis. For a further explanation of the reperception model, see the entry Reperceptive hallucination.

### References

- Kahlbaum, K. (1866). Die Sinnesdelirien. *Allgemeine Zeitschrift für Psychiatrie und psychisch-gerichtliche Medizin*, 23, 56–78.
- Penfield, W. (1975). *The mystery of the mind. A critical study of consciousness and the human brain*. Princeton, NJ: Princeton University Press.

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## Reperceptive Hallucination

Also known as \*experiential hallucination, experiential hallucinosis, experiential phenomenon, memory flashback, and \*hallucination of memory. All six terms are used to denote a hallucination taking the form of a reperception or re-enactment of previously perceived scenes, objects, or stimuli. As the British physician John Ferriar (1761–1815) noted as early as 1813, hallucinations may well spring from recollections of familiar images. In 1866 the German psychiatrist Karl Ludwig Kahlbaum (1828–1899) called this process *Reperzeption*. He dubbed the resulting percepts reperceptive hallucinations, so as to distinguish them from what he called \*perceptive hallucinations. During the era of classic psychiatry, reperception tended to be envisaged as the result of direct cortical stimulation. As the German psychiatrist Emil Kraepelin (1856–1926) wrote in 1899, “It is possible that in the ordinary process of thinking recurrent stimulation, [or] ‘reperception’ as Kahlbaum called it, always occurs to a very slight degree, and that only when this process reaches a pathological extension or when the sensory areas are in a state of increased excitability, does the vividness of the memory image approach that of sense perception.” Kahlbaum's \*reperception model gained empirical support from the cortical probing experiments carried out by the group headed by Wilder Graves Penfield (1891–1976). As noted by this group, the electrical probing of distinct sensory cortical areas may result in lively re-enactments of previously memorized events. Although initially Penfield agreed with classic authors such as Kraepelin that the sensory cortical areas themselves might be responsible

for the mediation of these hallucinations, in his later work he drew attention to the involvement of limbic structures such as the hippocampus. This view concerning the involvement of limbic structures is in keeping with the now dominant long-term potentiation (LTP) model of synaptic transmission, which links memories to alterations in the synaptic transmission of hippocampal neuronal circuits. It has been suggested that perceptible hallucinations may be related in a conceptual and phenomenological sense (and perhaps in a pathophysiological sense as well) with other mnemonic events such as \*flashbacks in PTSD, \*palinopsia, drug-related \*flashbacks, \*eidetic imagery, and \*flashbulb memories.

### References

- Ferriar, J. (1813). *An essay towards a theory of apparitions*. London: Cadell and Davies.
- Gloor, P., Olivier, A., Quesney, L.F., Andermann, F., Horowitz, S. (1982). The role of the limbic system in experiential phenomena of temporal lobe epilepsy. *Annals of Neurology*, 12, 129–144.
- Kahlbaum, K. (1866). Die Sinnesdelirien. *Allgemeine Zeitschrift für Psychiatrie und psychisch-gerichtliche Medizin*, 23, 56–78.
- Kraepelin, E. (1990). *Psychiatry: A textbook for students and physicians. Volume I*. Translation of Volume I of the German sixth edition (1899) by Metoui, H. Edited by Quen, J.M. Canton, MA: Watson Publishing International.
- Penfield, W., Perot, P. (1963). The brain's record of auditory and visual experience: A final summary and discussion. *Brain*, 86, 595–696.

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## Repetition of Reading

see Echo of reading.

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## Reported Auditory Sensation (RAS)

A term introduced during the early 1960s in an attempt to operationalize what is actually measured in studies of \*auditory hallucinations and auditory \*imagery. For a discussion of the rationale behind the introduction of this notion, see the entry Reported visual sensation (RVS).

### Reference

- Myers, T.I., Murphy, D.B. (1960). *Reported visual sensation during brief exposure to reduced*

*sensory input*. Research memo from the Human Resources Research Office, George Washington University. Alexandria, VA.

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## Reported Visual Sensation (RVS)

A term introduced in or shortly before 1960 by the American military research psychologists Thomas I. Myers and Donald B. Murphy in an attempt to operationalize what is actually measured in studies of \*visual hallucinations and visual \*imagery. As noted by the authors, the subjective and private nature of these phenomena prevents researchers from accessing them directly, i.e. other than through self-observation. As a consequence, research into hallucinatory phenomena in third parties is always dependent on *reports* of hallucinations. This holds true even for present-day functional imaging studies, which are capable of corroborating hallucinatory activity within the CNS, but not without the subject's aid in indicating the qualitative and temporal aspects of their hallucinations. Strictly speaking, therefore, the raw material of empirical hallucinations research consists of linguistic utterances. This point of view is echoed in the definition of hallucinations as advocated by the British historian of psychiatry German E. Berrios, which runs as follows: "Hallucination is the generic name for a class of utterances reporting subjective experiences (putatively) perceptual in nature which occur in the (arguable) absence of an adequate external stimulus." Although this line of reasoning brings a certain sobering and refreshing element to the scientific study of hallucinations, its employment for empirical research purposes has been criticized on various grounds. As the American psychologist A. Michael Rossi maintains in reference to Myers and Murphy's operational definition of the RVS, "The operational definition of the term explicitly limits its reference solely to *reports*. Proper use of the phrase requires that differences between various imagery *experiences* be ignored, and, indeed, that experience itself be ignored. Because interest of much sensory deprivation research has been on imagery *experiences* (as reflected in reports, but not equated with reports), the operationally defined term is inadequate in discussing these results or the interpretation of them. . . The use of an operationally defined term such as 'reported visual sensation' is valuable when it is used consistently and appropriately.



It can only lead to additional confusion, however, when it is used inconsistently to refer to the report, the experience, or both.” In analogy to the expression ‘reported visual sensation’, the term \*reported auditory sensation (RAS) has been proposed to refer to (reports of) auditory hallucinations and imagery. The general suspicion that individuals reporting a hallucination may not necessarily be referring to a perceptual phenomenon has led to the introduction of the notion \*sensory delusion.

### References

- Berrios, G.E. (2005). On the fantastic apparitions of vision by Johannes Müller. *History of Psychiatry*, 16, 229–246.
- Myers, T.I., Murphy, D.B. (1960). *Reported visual sensation during brief exposure to reduced sensory input*. Research memo from the Human Resources Research Office, George Washington University, Alexandria, VA.
- Rossi, A.M. (1969). *General methodological considerations*. In: *Sensory deprivation: Fifteen years of research*. Edited by Zubek, J.P. New York, NY: Appleton-Century-Crofts.

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### Retinal Shadow

The term retinal shadow is indebted to the Latin noun *retina* (little net). It is used to denote a \*pseudoptical phenomenon which is characterized by an inverted retinal image. A retinal shadow can be evoked experimentally by holding a pin upright, very close to the eye, while it is illuminated from behind by a beam of light that shines through a pinhole into the eye. The pin’s shadow will then be projected upside down on the retina, with fuzzy edges, conjuring up the \*illusion that the pin itself is in an upside-down position.

### Reference

- Johannsen, D.E. (1971). Early history of perceptual illusions. *Journal of the History of the Behavioral Sciences*, 7, 127–140.

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### Retinogenic Phenomenon

Also known as idioretinal phenomenon and idioretinal sensation. The term retinogenic phe-

nomenon is indebted to the Latin noun *retina* (little net) and the Greek noun *genesis* (creation, origin). It is used to denote a \*visual hallucination or \*illusion, often \*simple or \*geometric in nature, which is attributed to a (physiological or pathological) process within the retina. Some examples of retinogenic phenomena are \*afterimages, the Bjerrum scotoma, the \*idioretinal light, \*Haidinger’s brushes, and \*phosphenes mediated by the retina. Retinogenic phenomena are classified as \*entoptic phenomena.

### Reference

- Zuckerman, M. (1969). *Hallucinations, reported sensations, and images*. In: *Sensory deprivation: Fifteen years of research*. Edited by Zubek, J.P. New York, NY: Appleton-Century-Crofts.

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### Retroactive Hallucination

The term retroactive hallucination is indebted to the Latin words *retro* (backwards) and *agere* (to do, to act). It translates roughly as ‘a hallucination placed into one’s memory’. The term *hallucination rétroactive* was coined in or shortly before 1886 by the French internist and hypnotist Hippolyte Bernheim (1837–1919) to denote a percept suggested to a hypnotized subject, which is subsequently accepted, and incorporated into the subject’s memory. Bernheim gives the example of a woman, referred to as Marie G., to whom he made the suggestion that she had been out of bed four times in a row the previous night and that she had fallen and hurt her nose. When questioned, Marie G. would not only repeat what had been suggested to her, but would insist that she had a clear memory of walking around at night and seeing all the other patients in the hospital asleep. As noted by the Swiss psychiatrist, hypnotist, and entomologist August Forel (1848–1931), it is disputable whether such ‘images’ should be allowed to count as hallucinations, even if one accepts that the hypnotized subject can actually picture the suggested scene. As retrieved memories seldom take the form of \*reperceptions, and nothing in Bernheim’s text indicates that this was so in the case of Marie G., to designate these false memories as hallucinations would mean stretching the definition of hallucinations beyond its rightful limits.

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**References**

- Bernheim, H. (1886). *De la suggestion et de ses applications à la thérapeutique*. Paris: Octave Doin.
- Forel, A. (1895). *Der Hypnotismus. Dritte verbesserte Auflage*. Stuttgart: Verlag von Ferdinand Enke.

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**Retrocognition**

Also known as postcognition. The term retrocognition comes from the Latin words *retro* (backwards) and *cognoscere* (learning to know). It was introduced in or shortly before 1895 by the British classical scholar, writer, and poet Frederic Myers (1843–1901) to denote a hallucination, memory image, or idea depicting a past event which may or may not have been experienced in person. Allegedly, instances of retrocognition may occur spontaneously or at will. As noted by the American paranormal researcher Rosemary Ellen Guily, “Spontaneous retrocognition usually manifests as a hallucination or vision. The present surroundings are abruptly replaced by a scene out of the past. Although the vision is usually fleeting, some last for minutes and generally feature movement, sounds, and smells.” In biomedicine, such paroxysmal \*complex, \*compound, or \*scenic hallucinations tend to be identified as \*aurae (notably \*psychic auras), \*reperceptive hallucinations, or \*dissociative phenomena. The terms retrocognition and postcognition are used in opposition to the term \*precognition.

**References**

- Guily, R.E. (1991). *Harper's encyclopedia of mystical and paranormal experience*. New York, NY: Castle Books.
- Myers, F.W.H. (1895). The subliminal self: The relation of super-normal phenomena to time; - retrocognition. *Proceedings of the Society for Psychical Research*, 11, 334–593.
- Myers, F.W.H. (1903). *Human personality and its survival of bodily death. Volumes I and II*. London: Longmans, Green, and Co.

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**Reverie**

see Daydream.

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**Reversal of Vision Metamorphopsia**

see Inverted vision.

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**Reversed Conductibility of the Sensory Pathways**

The name of a classic explanatory model for the mediation of \*perceptive hallucinations, i.e. hallucinations which are ‘projected outwards’ and which therefore appear embedded in sense impressions from the external environment. During the late 19th century, perceptive hallucinations were thought to arise from memories or other endogenously generated images which are first shunted back to the senses via efferent nerve fibres, and then forward via afferent ones to the cerebral sensory cortex, along with perceptual information from the senses. The German chemist Ludwig Staudenmaier (1865–1933) argues that the sense organs may thus facilitate the ‘outward projection’ or ‘physical projection’ of perceptual material into extracorporeal space. The Italian psychiatrist Eugenio Tanzi (1856–1934) may well have been the first to conceptualize this mechanism, referring to it as ‘retrograde expansion’ or ‘reversed conductibility’. As he wrote in 1909, “It is sufficient to suppose, in order to give a satisfactory explanation of all varieties of hallucination, that... the homolateral and contralateral paths that pass from the centres of sensation to the centres of representation acquire the power, which they never possess in physiological conditions, of allowing impulses to travel in the reverse direction. We may consider that an hallucination takes origin as an idea or symbol, or as a more or less conscious fragment of an idea in the associative area, but that, instead of forming associations with other ideas, or of projecting itself externally in movement, it flows back, either along the same homolateral and contralateral fibres by which it came, or in some other way yet to be determined, to the sensorial centres from which it proceeded when it was of the nature of a sensation. Thus it becomes what it originally was – namely, a sensation; but it is a sensation of a pathological character on account of its unusual origin.” Tanzi sought to support this concept by an appeal to contemporary neuroanatomy, stating that “a few descending fibres occur with constant regularity in all

tracts of ascending projection. They are to be found between the visual cortex and the external geniculate body, between the external geniculate body and the retina, between the olfactory centres in the cortex and the olfactory bulb, and in the secondary and tertiary acoustic paths. It is not, therefore, out of the question that such fibres should exist also at a higher level than the sensorial centres." Tanzi's model may be classified as a \*centrifugal model of hallucinatory activity.

### References

- Schorsch, G. (1934). *Zur Theorie der Halluzinationen*. Leipzig: Verlag von Johann Ambrosius Barth.
- Tanzi, E. (1909). *A text-book of mental diseases*. Translated by Ford Robertson, W., Mackenzie, T.C. London: Rebman Limited.

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### Reversible Figure

see Ambiguous illusion.

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### Revisualization

see Post-traumatic flashback.

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### Riddoch Syndrome

see Riddoch's phenomenon.

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### Riddoch's Phenomenon

Also known as Riddoch syndrome and staticokinetic dissociation. Both terms are used to denote a \*blindness to stationary light stimuli, combined with an unaffected conscious perception of moving light stimuli. Riddoch's phenomenon is associated with \*cerebral amblyopia, a disorder of visual perception due to retrochiasmal lesions to the visual system which spare area V5, the specialized motion area of the visual cortex. The condition is named after the Scottish neurologist George Riddoch (1888–1947), who was the first to describe it in 1917, on the basis of observations of soldiers returning

from World War I with gunshot wounds affecting the calcarine cortex. On the basis of those same observations, Riddoch suggests that movement constitutes a special aspect of visual perception, to be distinguished from the perception of light, form, and colour. Conceptually, Riddoch's phenomenon constitutes the counterpart of \*akinetopsia (i.e. the inability to see motion).

### References

- Riddoch, G. (1917). Dissociation of visual perceptions due to occipital injuries, with especial reference to appreciation of movement. *Brain*, 40, 15–57.
- Zeki, S., ffytche, D.H. (1998). The Riddoch syndrome: Insights into the neurobiology of conscious vision. *Brain*, 121, 25–45.

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### Rimsky-Korsakov, Nikolai Andreyevich (1844–1908)

A Russian composer who experienced \*synaesthesias in the form of colours associated with major keys (i.e. \*coloured music).

### Reference

- Harrison, J. (2001). *Synaesthesia. The strangest thing*. Oxford: Oxford University Press.

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### River Illusion

A term attributed to the Greek philosopher Aristotle (384–322 BC), who reportedly used it as an equivalent of what is known today as \*waterfall illusion. For a more detailed account, see the entry Waterfall illusion.

### Reference

- Thompson, P. (1880). Optical illusions of motion. *Brain*, 3, 289–298.

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### Road Mirage

see Highway mirage.

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### Road Spray Bow

see Rainbow.

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### Rod-Monochromatism

see Achromatopsia.

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### Rorschach Audio

see Auditory pareidolia.

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### Rotational Aftereffect (RAE)

A term used to denote a \*motion aftereffect induced by fixation on a rotating stimulus. After this rotating stimulus has been viewed for several minutes, and then brought to a halt, the stimulus will appear to rotate in the opposite direction. The RAE is usually classified as a \*physiological illusion.

#### Reference

Mather, G., Verstraten, F., Anstis, S. (1998). *The motion aftereffect: A modern perspective*. Cambridge, MA: MIT Press.

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### Rubber Hand Illusion

A term used to denote a variant of the \*body schema illusion which is characterized by \*tactile hallucinations in one's hand while a visually presented rubber hand is being stroked. The resulting hallucinations have been interpreted as confirmation of the apparent primacy of the visual system over the tactile system.

#### Reference

Cooke, E.A.G., O'Regan, J.K. (2006). Size-manipulation of the body-schema using the rubber hand illusion. *Journal of Vision*, 6, 862, 862a.

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### Rubin Face

see Rubin's figure.

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### Rubin Vase

see Rubin's figure.

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### Rubin's Face

see Rubin's figure.



**Fig. 4** Rubin's figure. Source: Rubin, E. (1915). *Synsoplevede Figurer*. Copenhagen: Gyldenhal

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### Rubin's Figure

Also known as Rubin face, Rubin's face, Rubin vase, Rubin's vase, Rubin's vase-face illusion, goblet figure, and figure-ground vase. The eponym Rubin's figure refers to the Danish psychologist Edgar Rubin (1886–1951), who described the phenomenon in or shortly before 1915. It is used to denote a \*cognitive illusion which may arise while viewing an ambiguous

image depicting either a goblet, or two facing profiles. Because of the image's bistable nature, it is also classified as an \*ambiguous illusion.

### References

- Ninio, J. (2001). *The science of illusions*. Translated by Philip, F. Ithaca, NY: Cornell University Press.
- Rubin, E. (1915). *Synsoplevede figurer*. Copenhagen: Gyldenhals.

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### Rubin's Vase

see Rubin's figure.

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### Rubin's Vase-Face Illusion

see Rubin's figure.

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### Rudimentary Hallucination

The term rudimentary hallucination is indebted to the Latin noun *rudimentum*, which means first beginning. It is used to denote a type of hallucination that is vague, faint, or otherwise underdeveloped. Traditionally, rudimentary hallucinations are considered prognostically favourable. The term rudimentary hallucination is used in opposition to the term \*complete hallucination.

### Reference

- Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

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### Rümke's Characterization of Hallucinations and Illusions

In 1954, the Dutch psychiatrist Henricus Cornelius Rümke (1893–1967) characterized



**Fig. 5** Henricus Cornelius Rümke. Source: Van Belzen, J.A. (1988). *Gezondheid, Ziekte en Psychiatrie volgens H.C. Rümke*. Zeist: Kerckebosch

hallucinations and illusions as follows: "Already the Greeks made a distinction between hallucinations and illusions. As to the illusions it has been thought that the perception of an object in the external world underlies them, as to the hallucinations it is never an object in the external world underlying them. Here, too, we must realize: hallucinations and illusions do not exist in abstracto. All we are acquainted with are hallucinating and illusioning individuals."

### Reference

- Rümke, H.C. (1954). *Psychiatrie I. Inleiding*. Amsterdam: Scheltema & Holkema.

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## Saint Birgitta

see Bridget of Sweden.

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## Saint Teresa of Jesus

see Teresa of Ávila.

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## Salamander Brandy and Hallucinations

see Hallucinogenic salamander brandy.

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## Salicylate-Induced Hallucination

Salicylate is also known as salicylic acid and 2-hydroxybenzoic acid. The name salicylate is indebted to the Latin name *Salix*, which means willow tree (from the bark of which salicylates can be obtained). Salicylates constitute the active ingredient of acetylsalicylic acid (Aspirin) and many other therapeutics. \*Tinnitus is a frequent side effect of salicylate intoxication. \*Musical hallucinations have also been reported.

### Reference

Allen, J.R. (1985). Salicylate-induced musical perceptions. *New England Journal of Medicine*, 313, 642–643.

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## Santa Brigida

see Bridget of Sweden.

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## Saunders–Sutton Syndrome

see Delirium tremens.

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## Scale Illusion

see Musical illusion.

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## Scenic Hallucination

Also known as \*panoramic hallucination. The term scenic hallucination is indebted to the Greek noun *skênè*, which means stage, scene, spectacle. It is unknown by whom the term was introduced. It appears in a 1930 paper on the psychotropic effects of mescaline by the German psychologists Konrad Zucker and Julius Zádor as *szenenhafte Halluzination*. The term scenic hallucination refers to a \*complex visual hallucination (or, in a slightly different version of the concept, a \*compound hallucination) in which the entire sensory input is replaced by hallucinatory perceptions, thus constituting a totally different reality for the affected individual. As noted by the French psychiatrist Henri Ey (1900–1977), scenic hallucinations tend to fill out the whole visual

field and to remain unaffected by eye movements and by the opening and closing of the eyes. Contrary to \*cognitive illusions and \*perceptive hallucinations, scenic hallucinations do not incorporate objects or stimuli from the extracorporeal world. Nor do they employ these as \**points de repères* for their development. When scenic hallucinations are accompanied by a compelling sense of objectivity, they are said to have a high degree of \*xenopathy. When they are experienced simultaneously with the stream of regular sense impressions, the affected individual is said to be in a state of \*double consciousness. \*Deathbed visions which are in the nature of a scenic hallucination are referred to as \*total hallucinations. Hypnotically induced \*scenic hallucinations are also known as \*lucid dreams. Traditionally, scenic hallucinations are designated as 'higher' perceptual phenomena, closely related to \*dreams. As noted by Zucker and Zádor in their paper on mescaline experiments, scenic hallucinations can be evoked most easily while the eyes are closed. As one subject in their experiments remarked, such hallucinations are experienced as "dreaming with a waking mind". Zucker and Zádor use the term scenic hallucination in opposition to the term \*primitive hallucination.

### References

- Ey, H. (2004). *Traité des hallucinations. Tome 1*. Paris: Claude Tchou pour la Bibliothèque des Introuvables.
- Zucker, K., Zádor, J. (1930). Zur Analyse der Meskalin-Wirkung am Normalen. *Zeitschrift für die gesamte Neurologie und Psychiatrie*, 127, 15–29.

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### Scheerer's Phenomenon

see Blue field entoptic phenomenon.

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### Schizophrenia and Hallucinations

The term schizophrenia stems from the Greek words *schizein* (to split), and *phrèn* (nerve, diaphragm, heart). It was introduced in 1908 by the Swiss psychiatrist Paul Eugen Bleuler (1857–1939) to denote a group of mental disorders displaying certain similarities to Emil Kraepelin's (1856–1926) dementia praecox. Today the validity of the two nosological concepts is debated,

but in clinical and scientific practice the notion of schizophrenia is still in use. Among individuals with a DSM diagnosis of schizophrenia, hallucinations are reported in some 80% of the cases. \*Auditory hallucinations are the most prevalent form, with a lifetime prevalence of 56–70%. \*Visual hallucinations are reported in 29–56% of the cases. \*Olfactory hallucinations tend to be underreported, but lifetime prevalence rates range from 11 to 36%. In individuals with a DSM diagnosis of schizophrenia, other types of hallucination can and do occur as well, albeit less frequently. In clinical practice virtually any type of hallucination may be encountered in these individuals, including \*autoscopic hallucinations, \*brobdingnagian hallucinations, \*compound hallucinations, \*extracampine hallucinations, \*formicative hallucinations, \*gustatory hallucinations, \*kinaesthetic hallucinations, \*lilliputian hallucinations, \*musical hallucinations, \*negative hallucinations, \*proprioceptive hallucinations, \*reflex hallucinations, \*scenic hallucinations, \*sexual hallucinations, and \*somatic hallucinations. In addition, one may encounter sensory deceptions such as \*synaesthesias and \*illusions and sensory distortions such as \*metamorphopsias.

### References

- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders. Fourth edition, text revision*. Washington, DC: American Psychiatric Association.
- Blom, J.D. (2004). *Deconstructing schizophrenia. An analysis of the epistemic and nonepistemic values that govern the biomedical schizophrenia concept*. Amsterdam: Boom.
- Bracha, H.S., Wolkowitz, O.M., Lohr, J.B., Carson, C.N., Bigelow, L.B. (1989). High prevalence of visual hallucinations in research subjects with chronic schizophrenia. *American Journal of Psychiatry*, 146, 526–528.
- Nayani, T.H., David, A.S. (1996). The auditory hallucination: A phenomenological survey. *Psychological Medicine*, 26, 177–189.

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### Schneider's Definition of Hallucinations and Illusions

In 1946, the German psychiatrist Kurt Schneider (1887–1967) defined hallucinations and illusions as follows: "For psychiatric diagnosis, among the

many disorders of *perception*, the first among the experiential states, the most important ones are the sensory deceptions or *misperceptions*. It has been said time and again: these must involve sensory deception, i.e., that something sensory, experientially, not merely cognitive, is being experienced which is not there. That 'not there' is established objectively by the observer, not by the subject. When something is merely perceived as something else than it is in reality, we speak of illusions."

#### Reference

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### Schreber, Daniel Paul (1842–1911)

A German judge who was hospitalized three times and diagnosed variously with paranoia, dementia praecox, and \*schizophrenia. Schreber was rehabilitated after the first time he was discharged and reinstated as a judge, but had to be readmitted twice, and finally died in the asylum. The accuracy of Schreber's diagnosis has been subject to much debate among historians of psychiatry, despite the fact that his symptoms were

described with meticulous precision by his treating physicians, as well as in his autobiographical account *Memoirs of my Nervous Illness*. Apart from delusions, depression, agitation, euphoria, compulsive thinking, onomatomania, insomnia, hypochondriasis, and many other psychiatric and somatic symptoms, Schreber suffered from various types of hallucination. These included \*visual hallucinations, \*verbal and \*nonverbal auditory hallucinations, \*imperative hallucinations, \*tactile hallucinations, \*genital hallucinations, \*somatic hallucinations, \*olfactory hallucinations, \*gustatory hallucinations, \*hiliplutian hallucinations, and \*compound hallucinations. In addition, he suffered from \*diplopia, \*pareidolia, \*auditory pareidolia, an \*intermetamorphosis syndrome, various \**déjà* phenomena, and \*body schema illusions. The import of Schreber's work for hallucinations research lies in the combination of a first-hand acquaintance with hallucinatory phenomena and an exceptional ability to verbalize and analyze them. This combination places him in a league with other hallucinating intellectuals, such as Victor Kandinsky (1849–1889), Christoph Friedrich Nicolai (1733–1811), John Thomas Perceval (1803–1876), Vaslav Nijinsky (1889–1950), Guy de Maupassant (1850–1893), Fjodor Dostoevsky (1821–1881), and Ludwig Staudenmaier (1865–1933).

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Fig. 1 Daniel Paul Schreber

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### Schucman, Helen (born Helen Cohn, 1909–1981)

A professor of medical psychology at Columbia University, New York, who for seven consecutive years experienced an 'inner voice' which claimed to belong to Jesus Christ. The voice dictated to



her a 669-page text (which was subsequently published as *A Course in Miracles*), two supplemental pamphlets, and a collection of poems which were published under the title *The Gift of God*. Judging by Schucman's own accounts, her 'inner voice' may perhaps be best designated as an \*internal verbal auditory hallucination. Allegedly, she was also familiar with \*visual hallucinations, more specifically \*scenic hallucinations depicting people and places. Although the coherence, scope, and depth of Schucman's texts are hardly indicative of pathology, it has been suggested that they may have been produced under the influence of cryptomesia and that Schucman herself may have suffered from \*schizophrenia or multiple personality disorder. How disorders such as these might allow for a professional career at one of the world's top medical institutions remains unexplained.

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### Schumann, Robert (1810–1856)

Also known as Robert Alexander Schumann, Benjamin Gottlieb Schumann, and Gottlob Schumann. A German composer, music journalist, and critic who from adolescence onwards suffered from severe depressions with recurrent suicidal ideations and who during adulthood may well have suffered from \*syphilitic hallucinosis. From childhood onwards Schumann had frequently experienced sleep disturbances, \*nightmares, \*hypnagogia, \*lucid dreams, and \*musical hallucinations. After his first nervous breakdown at age 23, he claimed to have written some of his best works "at the urging of inner voices". However, especially during the night time he also experienced distressing "eternal sounds", which he further designated as "buzzing and poetry in my ears". It has been speculated that the latter hallucinations may have been induced by alcohol, which he was then accustomed to consuming in great quantities at taverns and at parties. During the first days of February, 1854, Schumann began to experience \*nonverbal audi-

tory hallucinations consisting of a single note (A), identified by some authors as \*tinnitus. But within a few days the single note developed into elaborate musical and \*verbal auditory hallucinations. As noted by his wife Clara, Schumann heard "music that is so glorious, and with instruments sounding more wonderful than one ever hears on earth." He also claimed that the Austrian composer Franz Schubert (1797–1828) had appeared before him and given him a magnificent melody. Nevertheless, the musical hallucinations were so unnerving that Schumann underwent a rapid mental disintegration. At first he attributed the music to angels hovering around him, calling out to welcome him. But soon the angels' voices transformed into demons' voices, who, accompanied by horrible music, told him that he was a sinner and that he would be thrown into hell. Allegedly Schumann also saw tigers and hyenas rushing forward to attack him. After a few days the music disappeared, only to be replaced by spoken words. On 27 February 27 1854, Schumann was so desperate that he threw himself into the Rhine. His suicide attempt failed. He was subsequently admitted to an asylum, where he died 2 years later, possibly as a result of neurosyphilis. Whether this diagnosis is correct has been heavily debated in the biomedical literature. Other suggested diagnoses include progressive paralysis, \*schizophrenia, manic-depressive illness, major affective disorder, and tuberculosis.

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### Scierneuropsia

The term scierneuropsia comes from the Greek words *skieros* (shady), *neuron* (nerve), and *opsis* (seeing). It was introduced in or shortly before 1958 by the American psychiatrist and psychoanalyst Peter A. Martin to denote a psychogenic visual symptom in which perceived objects and stimuli lack their usual brightness, and thus appear to be in a shadow. Martin describes scierneuropsia in analogy with the ophthalmologic definition of \*scieropia as a persistent, disturbing difficulty in seeing objects as vividly as they

had appeared before. As he asserts, "Patients described their visual disturbance in terms of light perception. They stated that objects now appeared dim, that brightness was no longer present. They felt that more light was needed to see the objects, which appeared as if seen through a screen or a veil or as if in a shadow." The reason for Martin to coin the term scierneurop-sia was that he envisaged the symptom as exclusively psychogenic in nature and that he wished to distinguish it from a phenomenologically similar symptom with an organic etiology, known as \*obscuratation. In Martin's opinion, scierneurop-sia may occur quite regularly under physiological circumstances, notably upon awakening. According to him this physiological \*hypnopompic phenomenon tends to be transient in nature. He regards persistent cases of scierneurop-sia as pathological. As he explains in psychoanalytic fashion, "The patients with scierneurop-sia struggle with a symptom arising from a hallucination of a visual screen. This screen expresses a wish to return to a state of sleep as a needed barrier between themselves and reality. The barrier is needed to prevent an outburst of unneutralized aggressive energy, of anal- or oral-sadistic origin." Scierneurop-sia may be classified as a variant of \*sensory conversion. Phenomenologically, it shows certain similarities to scieropia and \*hemeralopia (i.e. day blindness).

#### Reference

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#### Scieropia

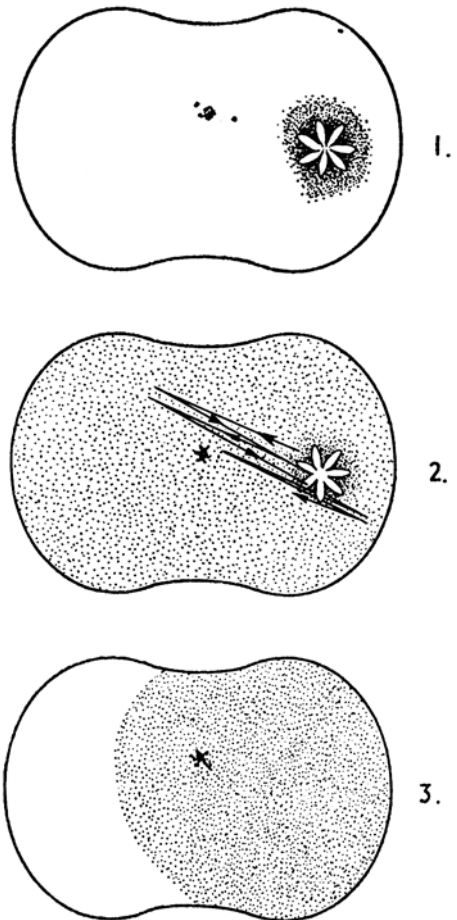
The term scieropia comes from the Greek words *skieros* (shady) and *opsis* (seeing). It translates as 'shady sight' or 'shady eye'. The term is used to denote a visual symptom in which perceived objects and stimuli lack their usual brightness and thus appear to be in a shadow. Contrary to \*scierneurop-sia, scieropia is not conceptualized as necessarily psychogenic in nature. Phenomenologically, scieropia shows certain similarities to scierneurop-sia, \*hemeralopia, and \*achromatopsia. It should not be confused with \*obscuratation.

#### Reference

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#### Scintillating Scotoma

Also known as fluttering scotoma, \*fortification spectrum, fortification figure, \*fortification of



**Fig. 2** Migraine scotomata. Source: Gowers, W.R. (1904). *Subjective sensations of sight and sound: Abiotrophy, and other lectures*. Philadelphia, PA: P. Blakiston's Son & Co

Vauban, geometrical spectrum, herringbone, Norman arch, telehopsia, and \*teichopsia. The term scintillating scotoma is indebted to the Latin noun *scintilla* (spark) and the Greek noun *skotos* (darkness). It was coined in or shortly before 1870 by the British physician and *migraineur* Hubert Airy (1838–1903), whose father was a *migraineur* as well. Airy's classical autodescription of the phenomenon runs as follows. "When it was at its height it seemed like a fortified town with bastions all around it, these bastions being coloured most gorgeously... All the interior of the fortification, so to speak, was boiling and rolling around in a most wonderful manner as if it was some thick liquid all alive." Today the terms scintillating scotoma, fortification spectrum, and the others mentioned above are used to denote a \*geometric visual hallucination consisting of an extremely bright, sometimes coloured, zigzag line or 'fortification wall', which may begin near the fovea in one hemifield and then spread out towards the periphery of that same hemifield without touching the vertical meridian. For a further description of this phenomenon, see the entry Fortification spectrum.

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### Scintillation

The term scintillation is indebted to the Latin noun *scintilla* (spark). In a general sense, it is used as a synonym for the term \*photopsia. In a more specific sense, it is used to denote the twinkling characteristic of the \*unformed and \*formed hallucinations occurring in a \*migraine aura (i.e. \*scintillating scotomata).

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### Scotoma

Also known as \*negative scotoma. The term scotoma comes from the Greek noun *skotos* (darkness). It is used to denote an area or island of loss or impairment of vision, surrounded by a field of normal or relatively well-preserved vision. In accordance with the degree of loss of vision, scotomata may be divided into relative and absolute scotomata. The group of relative scotomata is subdivided into shallow and deep scotomata. In accordance with their localization within the field of vision, scotomata are commonly divided into central and peripheral (or paracentral) scotomata. When central scotomata extend towards the area of the blind spot, they are referred to as centro-cecal scotomata. When central scotomata have a ring shape, leaving both central vision and peripheral vision intact, they are referred to as peri-central scotomata. When peripheral scotomata appear as an extension of the blind spot, they are referred to as Seidel's scotomata. When peripheral scotomata have a ring shape, they are referred to as annular scotomata or ring scotomata. For cases of \*achromatopsia that confine themselves to an island-shaped region of the visual field, the term \*colour scotoma is used. Migraine attacks are often preceded by a \*scintillating scotoma, which typically takes the form of a ball of light within the central field of vision, developing into a shimmering arc of white or coloured lights. This arc may go on to assume the shape of a \*fortification spectrum. The retina's \*blind spot is sometimes referred to as a physiological scotoma.

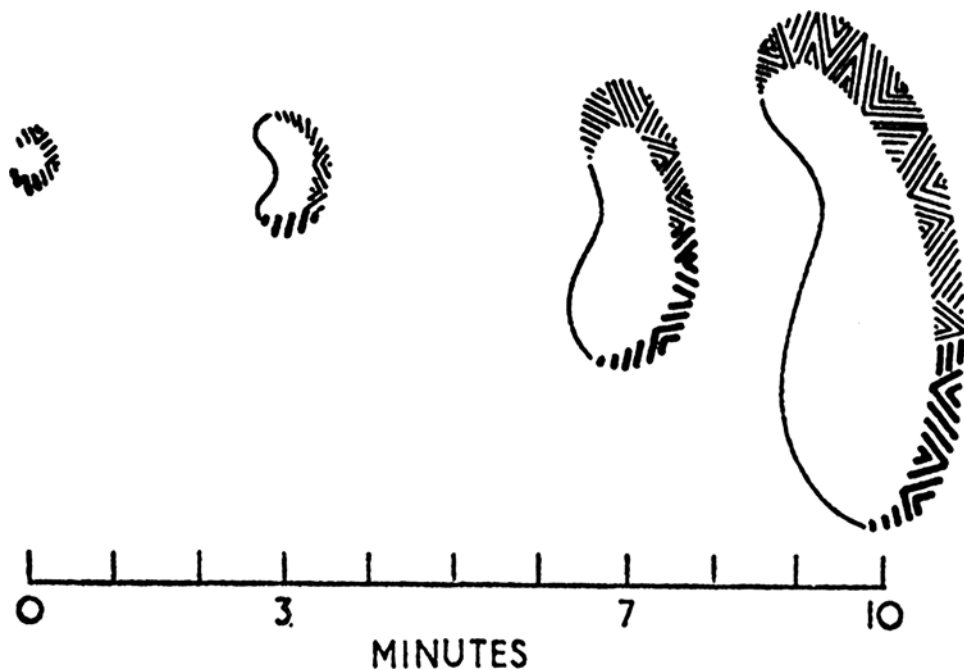
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### Scotomization

The term scotomization comes from the Greek noun *skotos* (darkness). In the older literature it is used as a synonym for the term \*negative hallucination. Both terms are used to denote the failure to perceive an object or stimulus



**Fig. 3** Evolution of scintillating scotomata. Source: Gowers, W.R. (1904). *Subjective sensations of sight and sound: Abiotrophy, and other lectures*. Philadelphia, PA: P. Blakiston's Son & Co

that is present within one's range of perception. The term scotomization was introduced in or shortly before 1926 by the French psychoanalysts Edouard Pichon (1890–1940) and René Laforgue (1894–1962). In psychoanalytic theory, the term scotomization is used to denote the tendency to ignore, or to be blind to, certain impulses or memories, especially those experienced as a threat to the individual's ego.

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### Scriabin, Alexander Nikolayevich (1872–1915)

A Russian composer who reportedly experienced a variant of synaesthesia called \*coloured hearing, or, more specifically, \*coloured music. As

recounted by the British psychologist Charles S. Myers (1873–1946), who interviewed Scriabin personally, “In general, when listening to music, he (Scriabin) has only a ‘feeling’ of colour; only in cases where the feeling is very intense does it pass over to give an ‘image’ of colour.” Scriabin claimed that he had become aware of his synaesthetic ability during a concert in Paris, which he attended in the company of his compatriot Nikolai Rimsky-Korsakov (1844–1906), who also experienced coloured music. Together, the two of them later set out to design performances which combined colour and music (referred to as colour music, or visual music). The notion that coloured hearing is idiosyncratic may have been confirmed by the fact that the two composers agreed only on the colour of D major (yellow), whereas they held different opinions on all other colour-key associations. It has been noted by synaesthesia experts that Scriabin would seem to have developed his synaesthesia unusually late in life, namely during young adulthood, whereas most individuals are aware of this special ability from early childhood onwards. Scriabin also lacked colour-key corre-

spondences for D flat, A flat, E flat, B flat, and F, explaining this with the words that these may well be “either ultraviolet or infrared”. On the basis of these somewhat unusual circumstances, it has been suggested that Scriabin may not have been a ‘true synaesthete’. For other historical examples of persons experiencing coloured music, see the entries Nussbaumer, F.A. and Rimsky-Korsakov, Nikolai.

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## Secondary Personality

see Double consciousness.

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## Secondary Sensation

see Synaesthesia.

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## Secondary Sense Perceptions

see Synaesthesia.

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## Seepage Theory

see Perceptual release theory of hallucinations.

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## Seizure-Induced Synaesthesia

see Epileptic synaesthesia.

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## Sejunction Hypothesis

The term sejunction comes from the Latin noun *sejunctio*, which means divorce, separation. It was introduced in or shortly before 1900 by the German neurologist Carl Wernicke (1848–1904) to denote an intracerebral mechanism by means of

which regular associative processes are blocked and then shunted into an aberrant direction. In conformity with the \*dissociation model of hallucinatory experience as formulated by the German hallucinations researcher Edmund Parish (1861–1916), Wernicke’s sejunction hypothesis postulates that the majority of hallucinatory phenomena arise from aberrant activation of the sensory cortex’s projection fields, in the absence of a matching object or stimulus in the outside world.

### References

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## Selective Sparing of Colour Vision

The expression selective sparing of colour vision refers to a rare syndrome in which the affected individual is blind, except for the conscious perception of colour. The condition was first described in 1933 by the American neurologist Israel Spanier Wechsler (1886–1962) in relation to an individual who had suffered from carbon monoxide poisoning. After having been unconscious for 2 h due to a house fire, the man turned out to be virtually blind. However, his colour vision was so well preserved that he was able to distinguish colours and even shades of colours. As Wechsler concludes, “The case herein presented warrants the statement that color vision and visual acuity can be dissociated in such a way that the former is preserved while the latter is impaired.” Conceptually as well as phenomenologically, selective sparing of colour vision constitutes the counterpart of \*achromatopsia.

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### Self-Talk

see Inner speech.

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### Sense of Presence

see Sensed presence.

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### Sensed Presence

Also known as sense of presence, feeling of a presence (FOP), idea of a presence, hallucination of presence, false proximate awareness, false bodily awareness, intruder hallucination, somaesthetic phantom double, somaesthetic doppelgänger, heatoscopy without optical image, phantom impressions, *Anwesenheit*, concrete awareness, and vivid physical awareness (*leibhafte Bewusstheit*). All these terms are used to denote the intuitive feeling of someone or something nearby who cannot be perceived, or appears to reside at the fringe of vision. Sensed presence may be accompanied by \*visual, \*auditory, \*olfactory, and/or \*tactile hallucinations, but the phenomenon itself is considered to have no perceptual characteristics. The German psychiatrist and philosopher Karl Jaspers (1883–1969) has been credited with first describing the phenomenon at length, designating it as \**leibhafte Bewusstheit*. As Jaspers explains, “In such cases we are aware that something is present which at that moment is not based on any obvious sensory sign.” Jaspers distinguishes three features characteristic of sensed presence, comprising a sense of urgency, a sense of certainty, and a sense of vividness. Although sensed presence tends not to be classified as a \*hallucination proper, multiple references to the alleged hallucinatory nature of sensed presence can be found in the literature, sometimes with a reference to the observation made by the American psychologist and philosopher William James (1842–1910) that intuitive feelings such as sensed presence may be conceptualized as “imperfectly developed hallucinations”. Jaspers does not follow James in this respect, although he leaves open the possibility of a further development of sensed presence into a \*hallucination proper. Others have sought to solve this classificatory issue by designing novel categories of human experience (such as \*hallucinoid experience and \*minor hallucination) to which sensed

presence can be assigned. In still other classifications, sensed presence is relegated to the class of \*autoscopic phenomena. The latter solution is perhaps defensible in cases of sensed presence involving an illusory double of one’s self. In or shortly before 1917, the German theologian Rudolf Otto (1869–1937) coined the terms \*numinous and *numen praesens* to denote the sensed presence of a sacred or daemonic entity. Sensed presence is a phenomenon known to many healthy individuals. However, a heightened incidence of sensed presence has been described in a variety of pathological conditions. These include hysteria, \*psychotic states, \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy, Parkinson’s disease, \*hypnagogic and \*hypnopompic states, and REM-related parasomnias such as \*sleep paralysis. Sensed presence occurring during sleep paralysis has been associated with REM-related endogenous activation of a hypervigilant and biased attentive state. It has been claimed by the American-Canadian neuropsychologist Michael A. Persinger (b. 1945) that sensed presence can be evoked experimentally with the aid of a \*Koren helmet or God helmet, as this device is colloquially referred to.

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### Sensorial Hallucination

Also known as \*psychic hallucination. The term sensorial hallucination is indebted to the Latin

noun *sensorium*, which means seat of the senses, or brain. It was used in 1846 by the French dream researcher Maurice Macario to denote a hallucination which the affected individual takes to be an ordinary sense perception, even though it is mediated by chemical changes or “nerve fibre vibrations” in the brain. Macario’s concept of the sensorial hallucination would seem to fit in with the \*centrifugal theory of hallucinatory activity. The term was used by him in opposition to the terms \*ganglionic hallucination, \*intuitive hallucination, and \*sthenic hallucination.

#### Reference

Macario, M. (1846). Des rêves considérés sous le rapport physiologique et pathologique. *Annales Médico-psychologiques*, VIII, 170–218.

images, and \*hypnagogic or \*hypnopompic phenomena that are experienced by the affected individual as if controlled, guided, or summoned up by an alien force. In the parapsychological literature, the group of sensory automatism also includes \*apparitions, inspirations, and cases of \*clairvoyance or \*clairaudience. The term sensory automatism is used in opposition to the term motor automatism, which was also coined by Myers, and which was used by him to denote a class of involuntary motor movements.

#### References

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Myers, F.W.H. (1903). *Human personality and its survival of bodily death. Volume I*. London: Longmans, Green, and Co.

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### Sensorineural Tinnitus

A term used to denote a type of \*tinnitus (i.e. ‘ringing in the ears’) which is attributable either to the ear’s sensorineural parts or to the acoustic nerve. Sensorineural tinnitus can be divided into four subcategories, comprising \*motor tinnitus, \*transduction tinnitus, \*transformation tinnitus, and \*objective tinnitus. The term sensorineural tinnitus is used in opposition to the terms \*conductive tinnitus and \*central tinnitus.

#### Reference

Henry, J.A., Dennis, K.C., Schechter, M.A. (2005). General review of tinnitus. Prevalence, mechanisms, effects, and management. *Journal of Speech, Language, and Hearing Research*, 48, 1204–1235.

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### Sensory Automatism

A term introduced in the posthumously published work of 1903 by the British classical scholar, writer, and poet Frederic Myers (1843–1901) to denote a type of \*automatism which takes the form of an illusory or hallucinatory percept. As Myers asserts, “The products of inner vision or inner audition externalised into quasi-percepts, – these form what I term *sensory automatism*s.” The group of sensory automatism comprises hallucinations, \*illusions, \*dream

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### Sensory Conversion

A term that has historically had a variety of meanings and connotations, most of which revolve around the notion of a pathological process by means of which anxiety, generated by an intrapsychic conflict, is unconsciously transformed into an illusory or hallucinatory percept. The term conversion was possibly introduced in 1795 by the British physician John Ferriar (1761–1815), who used it in the context of what he called hysterical conversion. In 1895, the term conversion was borrowed by the Austrian psychoanalysts Josef Breuer (1842–1925) and Sigmund Freud (1856–1939) to denote the development of sensory and motor symptoms in hysteria. In the literature on sensory conversion, the resulting illusory and hallucinatory percepts are designated as \*conversive hallucinations or \*conversion hallucinations. In classifications such as the *Diagnostic and Statistical Manual of Mental Disorders* (DSM), sensory conversion is classified as a symptom of conversion disorder, which itself constitutes a subclass of the somatoform disorders. Conversion disorder is a nosological category which shows considerable overlap with notions such as somatization and hysteria. It is conceptualized as a syndrome characterized by an alteration of sensory and/or motor functions suggestive of a neurological disorder, but one which cannot be confirmed by means of state-of-the-art physical and auxiliary examination. To avoid the pitfall of dealing with a somatic dis-

ease as yet unknown to medicine by passing it off as conversion, psychological factors must be presented which are associated with the onset and/or exacerbation of the symptoms. Two common examples of conversion disorder are conversion paralysis and \*conversion blindness. In both cases, the affected individual is thought to resolve an underlying conflict by the unconscious use of symptoms. \*Scierneuropsia, a psychogenic visual disturbance characterized by a perceived lack of brightness in extracorporeal objects and stimuli, may well fit into this category. The term sensory conversion is used in opposition to the term motor conversion, which is conceptualized as a symptom or condition in which anxiety generated by an intrapsychic conflict is transformed into motor symptoms. The 1982 *Manual for the Assessment and Documentation of Psychopathology* (AMDP) lists pseudoneurologic bodily disturbances such as aphonia, blindness, deafness, paresis, abasia, and psychogenic seizures as typical conversion symptoms.

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### Sensory Deception

Also known as misperception. Both expressions are umbrella terms for hallucinations and \*illusions. In *Fish's Clinical Psychopathology* the notion of sensory deception is used in opposition to \*sensory distortion (the latter term being used to denote one or more changes in the intensity, quality, or spatial form of a sense perception). Both groups of phenomena are themselves classified as \*perceptual disturbances.

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- Slade, P.D., Bentall, R.P. (1988). *Sensory deception. A scientific analysis of hallucination*. London: Johns Hopkins University Press.

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### Sensory Delusion

A term used to denote the erroneous conviction that one is experiencing a hallucination, while the verbal report expressing the experience is testimony of a non-perceptual experience such as a thought or a memory. The term sensory delusion is used to express the general suspicion that individuals reporting on hallucinations may not always be experiencing or 'reading off' a percept. As pointed out by the American military research psychologists Thomas I. Myers and Donald B. Murphy, the raw material of hallucinations research can be said to consist of linguistic utterances which may or may not refer to perceptual experiences. This point of view is echoed in the work of the British historian of psychiatry German E. Berrios, who conceptualizes hallucinations as "verbal reports of 'sensory' experiences, with or without insight, not vouchsafed by a relevant stimulus." Myers and Murphy were responsible for introducing the notions of \*reported visual sensation (RVS), and \*reported auditory sensation (RAS), which came to serve as standard jargon in some of the \*sensory deprivation studies carried out during the 1960s and early 1970s.

### References

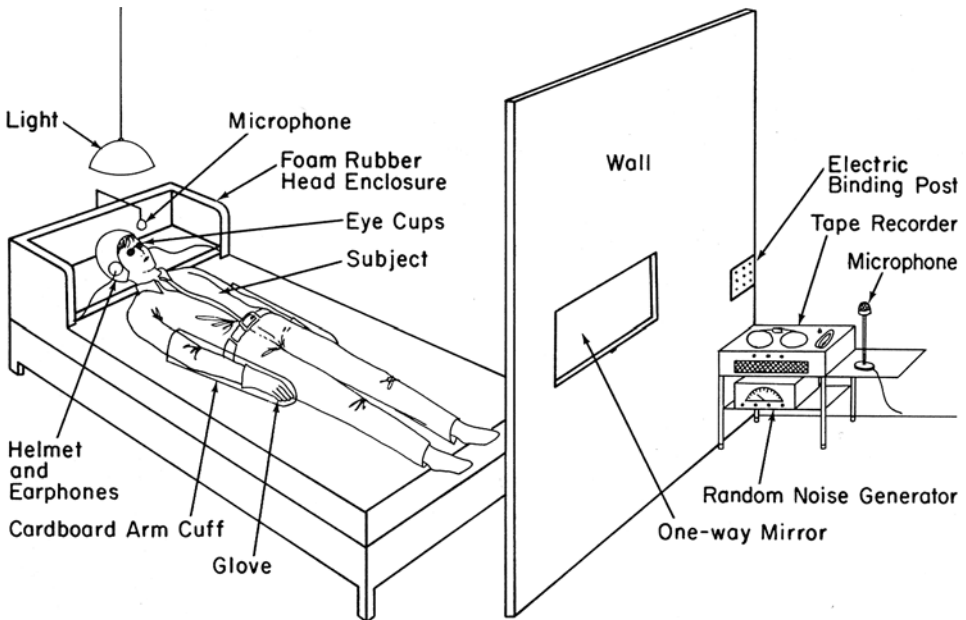
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## Sensory Deprivation Experiments and Hallucinations

Sensory deprivation experiments are also known as isolation experiments. Both terms are used to denote an experimental study in which a test person is subjected to a drastically reduced and depatterned sensory input. Biomedical case reports of the hallucinatory effects of sensory deprivation date back to the 19th century. In 1861, for example, the German psychiatrist Christian Friedrich Wilhelm Roller (1802–1978) published an account of the effects of solitary confinement on mental health. Similar reports stem from solitary sailors, mountaineers, and polar explorers. The phenomenon itself has been known since ancient times, as witness many of the ‘spiritual journeys’ reported by shamans and mystics. The systematic study of sensory deprivation was initiated in or shortly before 1951 by the Canadian psychobiologist Donald Olding Hebb (1904–1985). Hebb had received a government assignment to evaluate the effects of Chinese and

Russian brainwashing techniques based on sensory deprivation. An unexpected finding in his initial study was the spontaneous report of hallucinations by 14 test persons. Out of this group, 11 individuals reported only \*simple and \*geometric visual hallucinations, whereas the other 3 also reported \*scenic hallucinations. As Hebb wrote in 1954, “It appears that the activity has a rather regular course of development from simple to complex. The first symptom is that the visual field, when the eyes are closed, changes from a dark to a light contour; next there are reports of dots of light, lines, or simple geometrical patterns. All 14 subjects reported such imagery (in runs lasting from two to six days), which was a new experience to them. The next step, reported by 11 subjects, is seeing something like wallpaper patterns. Then came isolated objects, without background, reported by 7 out of 14, and finally integrated scenes usually containing dreamlike distortions, reported by three of the 11.” These findings prompted a series of similar experiments by Hebb and his colleagues Woodburn Heron, Harold Bexton, Benjamin Doane,



**Fig. 4** Sensory deprivation, experimental setting. Source: Goldberger, L., Holt, R.R. (1958). Experimental interference with reality contact (perceptual isolation): Method and group results. *Journal of Nervous and Mental Disease*, 127, 99–112

and Thomas Scott, and soon thereafter by many others in countries around the world. The means of sensory deprivation evolved from the use of cardboard arm cuffs, cotton gloves, and translucent or opaque goggles in sound-deadened isolation cubicles, to the use of sophisticated water-immersion techniques. Basically, however, each experiment involved the exposure of healthy individuals to prolonged periods of reduced and depatterned sensory input. As these studies confirmed, sensory deprivation may evoke \*visual illusions and hallucinations, \*metamorphopsias, and in some cases also \*tactile, \*somaesthetic, \*olfactory, and \*auditory illusions in the majority of healthy individuals within several hours to days. Next, the circumstances most favourable to the genesis of hallucinations were studied. Some studies indicated that hallucinations are most likely to occur when sensory input is diminished rather than absent. As Doane et al. concluded, "Unpatterned sensory stimulation increases the probability of hallucinatory activity". Hallucinations were also found to increase in frequency and variation when motility was restricted and when test persons were lying on their back rather than sitting in a chair. It is still unclear whether hallucinatory activity is influenced directly by such means of restraint or whether this influence should be attributed to the stress associated with restraint.

In some studies suggestions and expectations served to increase the frequency and variation of visual hallucinations and to induce additional \*auditory and \*kinaesthetic hallucinations – whereas in others, the suggestion that soft music would be played failed to induce any \*musical hallucinations. Pathophysiologically, hallucinations occurring in the context of sensory deprivation tend to be considered \*release phenomena. As a technique, sensory deprivation may be regarded as diametrically opposed to \*sleep deprivation (which results in a continuous bombardment of sensory stimuli). The expression 'pharmacologically induced sensory deprivation' is sometimes used to denote the effects of a group of hallucinogens known as \*dissociatives.

#### References

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- Vernon, J. (1963). *Inside the black room. Studies of sensory deprivation*. London: Souvenir Press.
- Zubek, J.P., ed. (1969). *Sensory deprivation: Fifteen years of research*. New York, NY: Appleton-Century-Crofts.

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### Sensory Distortion

Also known as perceptual distortion. Both terms are used to denote a change in the intensity, quality, or spatial form of sense perceptions. In *Fish's Clinical Psychopathology* the notion of sensory distortion is used in opposition to \*sensory deception (which comprises hallucinations and \*illusions). Both groups of phenomena are classified as \*perceptual disturbances.

#### References

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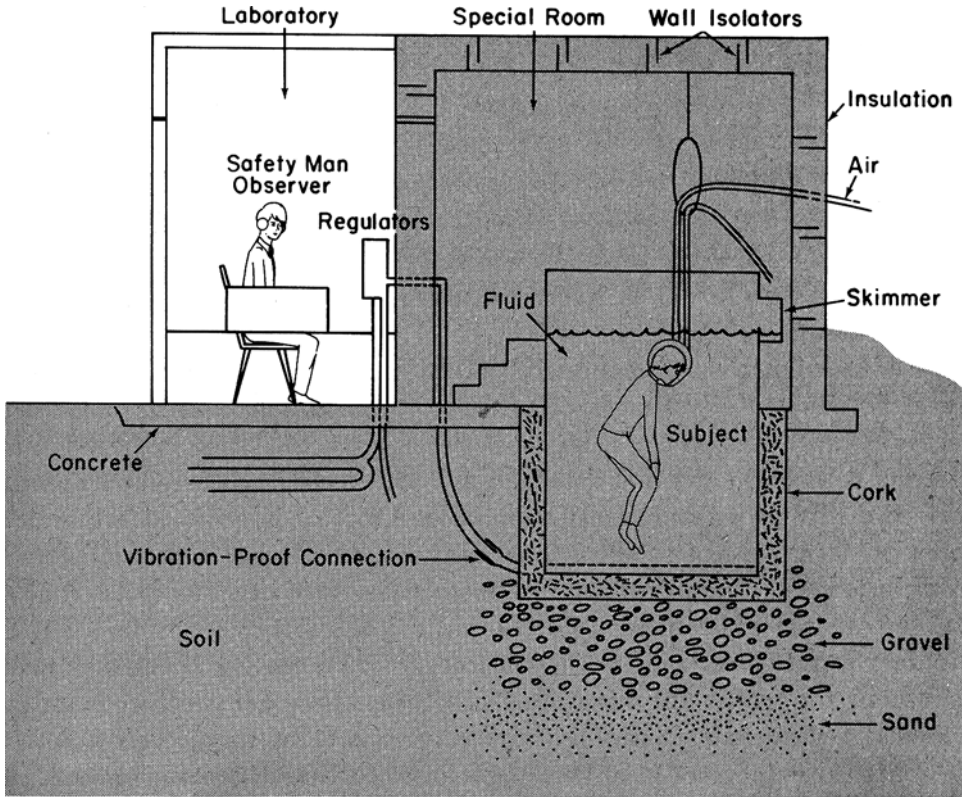
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### Sensory Hallucination

Also referred to as hallucination of the senses. Both terms are used by the British paranormal researcher Edmund Gurney (1847–1888) to denote "a percept which lacks, but which can only by distinct reflection be recognised as lacking, the objective basis which it suggests – where objective basis is to be taken as a short way of naming that the possibility of being shared by all persons with normal senses". Gurney uses the term sensory hallucination in opposition to the term \*non-sensory hallucination, which he reserves for remembered images, \*daydreams, mental pictures, etc.

#### Reference

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**Fig. 5** Sensory deprivation, experimental setting with water immersion. Source: Shurley, J. (1963). *Proceedings of the Third World Congress of Psychiatry, Volume 3*. Toronto: University of Toronto Press

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## Sexual Abuse and Hallucinations

see Child sexual abuse and hallucinations.

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## Sexual Hallucination

Also known as erotic hallucination. The term sexual hallucination is used in a general sense to denote a type of hallucination that is sexually charged, such as a \*visual hallucination depicting an alluring man or woman, a \*verbal auditory hallucination delivering a message with a sexual connotation or a \*panoramic hallucination in which pornographic scenarios are acted out. Sexual hallucinations of this general type are

found relatively frequently in individuals of \*old age with or without dementia. In a more specific sense, the term sexual hallucination refers to a \*tactile or \*somatic hallucination experienced in an erogenic zone such as the genitals, mammae, buttocks, anus, or mouth. As noted by the Swiss psychiatrist Eugen Bleuler (1857–1939), tactile or somatic hallucinations occurring in the context of \*psychosis would often seem to start out as genital sensations. Sexual hallucinations are also known to occur during or after anaesthesia. They have been reported after the application of substances such as nitrous oxide, chloroform, midazolam, and propofol. Unfortunately, actual sexual abuse cannot always be ruled out with certainty in such alleged instances of 'sexual hallucination'. The term \*nitrous oxide hallucination, for example, is used to denote a

hallucination experienced under the influence of nitrous oxide or nitrous oxide-oxygen. As these hallucinations are described as predominantly sexual in nature and tend to be reported mainly by young women, it has been suggested that the notion is little more than a smoke screen serving to protect health professionals guilty of sexual harassment. A syndrome of continuous sexual hallucinations occurring in the absence of any actual sexual lust or desire is known as the \*persistent sexual arousal syndrome (PSAS). Reportedly, the \*incubus and \*succubus phenomena occurring in the context of classical \*nightmares may also be erotically charged.

### References

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- Ey, H. (1973). *Traité des hallucinations. Tome 1*. Paris: Masson et Cie., Éditeurs.

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## Shaking Delirium

see Delirium tremens.

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## Shiny Ring

see Corona phenomenon.

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## Simple Hallucination

Also referred to as elementary hallucination. Both terms are used to denote a hallucination of the lowest degree of complexity. In the auditory modality, simple hallucinations are known as \*akoasms. Common examples of akoasms are clicking sounds, the sound of the door bell ringing, rustling noises, and buzzing. Akoasms may occur in the context of both peripheral and central conditions. In \*tinnitus, akoasms tend to

have a chronic and sometimes highly disturbing character. In the visual modality, simple hallucinations may take the form of \**Eigengrau*, \*flickering scotomata, \*photopsia, etc. Photopsia comprises a group of elementary visual phenomena such as \*phosphenes, luminous rays, coruscations, heat waves, \*snow lights, and \*Moore’s lightning streaks. Some of these simple phenomena can be provoked by gentle pressure to the eyeball (as in \*pressure phosphenes) or caloric vestibular stimulation (leading to \*vestibularly evoked visual hallucinations). It may therefore be tempting to believe that simple visual hallucinations invariably fall into the class of \*entoptic phenomena. But again many of them are associated with both peripheral and central conditions. The same holds true for simple hallucinations occurring in the tactile modality, such as \*paraesthesias, \*formicative hallucinations, and \*cocaine bugs. The term simple hallucination derives from a classification of hallucinations which employs complexity as a guiding principle. It is used in opposition to the terms \*organized (or \*formed) hallucination and \*complex hallucination. By their nature, \*olfactory and \*gustatory hallucinations defy categorization based on degrees of complexity. The same holds true for \*vestibular hallucinations, \*proprioceptive hallucinations, \*kinaesthetic hallucinations, and many \*somatic and \*sexual hallucinations.

### References

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- Wilkinson, F. (2004). Auras and other hallucinations: Windows on the visual brain. *Progress in Brain Research*, 144, 305–320.

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## Simple Metamorphopsia

The term simple metamorphopsia comes from the Latin adjective *simplex* (simple) and the Greek words *metamorphoun* (to change the form) and *opsis* (seeing). It is used to denote a type of \*metamorphopsia (i.e. a visual distortion) that is not accompanied by any alterations in the affective tone of one’s experience of the extracorporeal

environment. The term simple metamorphopsia is used in opposition to \*complicated metamorphopsia.

### References

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## Sitophobia and Hallucinations

see Fasting-Induced hallucination.

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## Size–Weight Illusion

see Charpentier's illusion.

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## Skin Reading

see Eyeless vision.

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## Skin Vision

see Eyeless vision.

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## Sleep Deprivation Hallucination

see Sleep deprivation-induced hallucination.

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## Sleep Deprivation-Induced Hallucination

Also known as sleep deprivation hallucination. The term sleep deprivation refers to the deliberate prevention of sleep. Sleep deprivation may be self-induced or induced by others, as in interrogation, torture, or sleep deprivation experiments. On the basis of sleep deprivation experiments it is known that many individuals can do without sleep for a period of up to 60 h without any substantial effects upon their performance on tasks with a novel or challenging character,

whereas their performance on familiar and especially boring tasks tends to decrease dramatically. After 30–60 h of sleep deprivation, overall performance tends to decrease and symptoms such as dysarthria, blurring of vision, \*diplopia, and the occurrence of \*microsleeps may become manifest. Microsleeps are defined as short lapses of time, on the order of a few seconds to a minute, during which the brain enters a sleep state and the amplitude of alpha waves on the electroencephalogram (EEG), characteristic of the waking state, tends to be lower. After six or more days without sleep, additional symptoms tend to arise such as drowsiness, disorientation in time and place, illusory alterations in the passage of time (i.e. \*time distortions), diminished reality monitoring, derealisation, depersonalization, formal thought disorder, a decrease in motor activity, paranoia, delusions, \*illusions (including the \*hat illusion), \*hypnagogic and \*hypnopompic hallucinations, \*hallucinations proper, \*metamorphopsias (such as \*micropsia, \*macropsia, \*pelopsia, \*macroproxiopia, and \*microtelepsia), and other \*misperceptions. Sleep deprivation-induced hallucinations tend to be visual in nature, but they can also be auditory, tactile, or compound in nature (such as the combined seeing and feeling of cobwebs all over one's body). Pathophysiologically, they are conceptualized as \*perceptual release phenomena. As a technique, sleep deprivation may be regarded as diametrically opposed to \*sensory deprivation. A person intentionally employing sleep deprivation for the purpose of exploring the psyche may be called a \*psychonaut.

### Reference

- Williams, H.L., Morris, G.O., Lubin, A. (1962). *Illusions, hallucinations and sleep loss*. In: *Hallucinations*. Edited by West, L.J. New York, NY: Grune & Stratton.

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## Sleep Dream

see Dream.

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## Sleep Dream Vision

A term used to denote a \*dream image occurring in the visual modality.

**Reference**

Mavromatis, A. (1987). *Hypnagogia. The unique state of consciousness between wakefulness and sleep*. London: Routledge.

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**Sleep Epilepsy and Hallucinations**

see Narcolepsy and hallucinations.

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**Sleep Paralysis and Hallucinations**

The term sleep paralysis refers to a transient experience of involuntary immobility immediately prior to falling asleep or upon awakening. It is conceptualized as the intrusion of REM muscle atonia and dream imagery into the waking state. Sleep paralysis may occur either in isolation or in the context of a neurological disease or syndrome (such as narcolepsy). Physiologically, it is associated with sleep-onset REM periods. In the International Classification of Sleep Disorders (ICSD), sleep paralysis is classified as a REM-related parasomnia. Cross-sectional surveys indicate that 6–40% of the general population are aware of having had at least one episode of sleep paralysis. During episodes of sleep paralysis, \*hypnagogic and \*hypnopompic hallucinations may occur. When these are of a frightening nature, they are referred to as \*waking-nightmare hallucinations.

**Reference**

Cheyne, J.A. (2003). Sleep paralysis and the structure of waking-nightmare hallucinations. *Dreaming*, 13, 163–179.

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**Sleep-Onset Nightmare**

see Hypnagogic nightmare.

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**Slide Show Format of Visual Hallucinations**

Also referred to as movie format of visual hallucinations. Both terms are used to convey the speed and recurrent discontinuities which charac-

terize \*visual hallucinations in some individuals. A rapid flow of images, as well as ‘jumps’ from one scene to the next lend these hallucinations the phenomenological quality of a slide show, a kaleidoscope, or a DVD in fast-forward mode. Sometimes the scenes appear as if projected upon a screen or window pane in front of the individual’s eyes, often with a bright light at the centre of the image. The slide show format of visual hallucinations has been described chiefly during \*hypnagogic and \*hypnopompic states, but it has also been described as a typical characteristic of \*cannabis- and \*hallucinogen-induced visual hallucinations. Although its pathophysiological basis is unknown, it is not unthinkable that there is a parallel with the pathophysiological substrates of \*akinetopsia (i.e. a selective deficit in the ability to perceive motion) and \*cinematographic vision (i.e. a transient form of akinetopsia occurring in the context of an \*aura).

**Reference**

Siegel, R.K., Jarvik, M.E. (1975). *Drug-induced hallucinations in animals and man*. In: *Hallucinations. Behavior, experience, and theory*. Edited by Siegel, R.K., West, L.J. New York, NY: John Wiley & Sons.

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**Slow-Motion Hallucination**

A term introduced in or shortly before 1951 by the American neurologist Caro W. Lippman (1886–1954) to denote a \*kinaesthetic hallucination characterized by a subjective sensation of a ‘slowing down’ of one’s body. As noted by one of Lippman’s patients, “All my motions seem very slow. I try to move faster, and seem to move even more slowly. At the same time, everything around me seems to move very fast.” Lippman classifies slow-motion hallucinations as variants of the \*space-motion hallucination. Because of their association with migraine, they may also be classified as \*aural phenomena. The accompanying sensation of things speeding up is called a \*quick-motion phenomenon.

**Reference**

Lippman, C.W. (1951). Hallucinations in migraine. *American Journal of Psychiatry*, 107, 856–858.

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## Smell Disorders

see Chemosensory disorders.

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## Smell Hallucination

see Olfactory hallucination.

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## Smell Illusion

see Olfactory illusion.

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## Smell Phonism

A term used to denote a type of \*synaesthesia characterized by a hallucinated sound (i.e. a \*phonism) which is triggered by a regular olfactory percept.

### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition.* Cambridge, MA: MIT Press.

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## Smell Photism

A term used to denote a type of \*synaesthesia characterized by a hallucinated colour sensation (i.e. a \*photism) which is triggered by a regular olfactory percept.

### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition.* Cambridge, MA.

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## Smetana, Bedřich (1824–1884)

A Czech composer who later in life suffered from hearing loss, possibly due to syphilis, and who reported \*musical hallucinations in the form of two male voices singing in G major, as well as a chord in A's major. The chord in A's major, also referred to in the literature as a form of \*tinnitus, appears as a piercing high-pitched tone in his symphony *Ma Vlast (My Life)*.

### References

Evers, S., Ellger, T. (2004). The clinical spectrum of musical hallucinations. *Journal of the Neurological Sciences*, 227, 55–65.  
 Morgenstern, L. (2005). The bells are ringing. Tinnitus in their own words. *Perspectives in Biology and Medicine*, 48, 396–407.

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## Snow Lights

Also known as cocaine spots. The term snow lights is indebted to the noun snow, which is slang for cocaine. Originally a street term, the expression snow lights was brought to the attention of the scientific community in 1978 by the American psychopharmacologist Ronald K. Siegel. The term refers to the sensation of objects moving about in the periphery of the visual field. It is described by chronic cocaine users as akin to the twinkling of sunlight reflected off of frozen snow crystals or, in an alternative reading, cocaine crystals. At first the affected individual tends to respond to snow lights with rapid orientations towards – or away from – the perceived movement. As soon as the phenomenon is accepted as illusory in nature, motor reactions tend to die out. Snow lights may be classified as \*simple visual hallucinations or as \*photopsias.

### References

Siegel, R.K. (1978). Cocaine hallucinations. *American Journal of Psychiatry*, 135, 309–314.

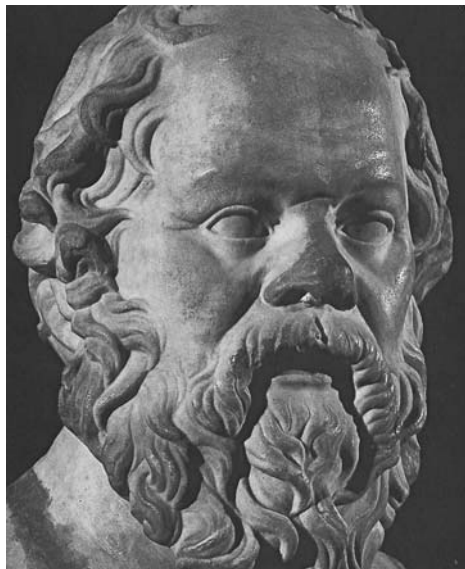
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## Socrates (470–399 BC)

An eminent Greek philosopher who may have experienced \*verbal auditory hallucinations. Socrates did not leave any writings known to us today, but as recounted by Plato (c. 428–347 BC) in the *Theages*, he heard a voice which he attributed to his *daimonion*, a benign spirit which purportedly accompanied him from an early age, and told him what *not* to do in important situations.

### References

Leudar, I., Thomas, P. (2000). *Voices of reason, voices of insanity. Studies of verbal hallucinations.* London: Routledge.



**Fig. 6** Socrates. Marble Roman artwork, possibly a copy of a work by Lysippos. Source: Musée du Louvre, Paris

Plato (1927). *Charmides, Alcibiades 1 & 2, Hipparchus, The lovers, Theages, Minos, Epinomis*. Translated by Lamb, W.R.M. Loeb Classical Library No. 201. Cambridge, MA: Harvard University Press.

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## Solar Wind and Hallucinations

The term solar wind is indebted to the Latin noun *sol*, which means sun. It refers to a vast stream of electrically charged atomic particles, consisting mainly of protons and electrons from the Sun's corona, which are continuously flowing outwards into space. This stream of particles is believed to ultimately extend past the orbit of Pluto. In 1988 the American-Canadian neuropsychologist Michael A. Persinger (b. 1945) reported on a positive correlation between the size of this corpuscular radiation from the Sun, and the incidence of bereavement hallucinations, which he interpreted as circumstantial evidence for the involvement of temporal magnetic-mediated microseizures in the mediation of this type of hallucination. Elaborating on Persinger's findings, the American psy-

chologists Walter and Steffani Randall compared longitudinal data on hallucinations (derived from the work of the British paranormal researchers Edmund Gurney (1847–1888) et al.) with the magnetic index *aa*, a measure of magnetic disturbances attributed chiefly to the effect of the solar wind on the Earth's atmosphere. By selecting the descriptions of \*visual and \*compound hallucinations in Gurney's work, which appeared in the form of \*apparitions or \*personifications (i.e. depicting human or humanoid forms), and then comparing their incidence and recorded month of occurrence with the recorded monthly values of the magnetic index *aa* over the same time span, Randall and Randall found a positive and statistically significant correlation. As the authors caution, this finding implies no causal relationship between the incidence of personifications and the solar wind, and may well be spurious. They do, however, suggest that a possible pathophysiological mechanism might be the influence of magnetic disturbances upon the pineal gland, resulting in the subsequent release of melatonin, a hormone believed to act synergistically with \*hallucinogens.

## References

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- Randall, W., Randall, S. (1991). The solar wind and hallucinations – A possible relation due to magnetic disturbances. *Bioelectromagnetics*, 12, 67–70.

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## Solvent Inhalation and Hallucinations

see Toluene-induced hallucination.

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## Somaesthetic Aura

Also written as somesthetic aura. Both terms are indebted to the Greek words *sōma* (body), *aīsthanesthai* (to notice, to perceive), and *aura* (wind, smell). They are used as synonyms for the term \*somatosensory aura.



**Reference**

Podoll, K., Robinson, D. (2002). Splitting of the body image as somesthetic aura symptom in migraine. *Cephalalgia*, 22, 62–65.

**Somaesthetic Doppelgänger**

see Sensed presence.

**Somaesthetic Hallucination**

Also written as somesthetic hallucination. Both terms are indebted to the Greek words *sōma* (body), and *aisthanesthai* (to notice, to perceive). They are used to denote a hallucination which is experienced in any – or several – of the somatosensory modalities. These modalities include the exteroceptive modality (comprising pain, light touch, tickle, pressure, heat, and cold), the proprioceptive modality (i.e. the muscle-tendon-joint sense), and the interoceptive modality (arising from the visceral body parts). Pathophysiologically, somaesthetic hallucinations are associated primarily with heightened activity in the primary somatosensory cortex, the posterior parietal cortex, and the thalamus. The concept somaesthetic hallucination displays considerable overlap with the concepts \*somatic hallucination, \*tactile hallucination, \*kinaesthetic hallucination, and \*proprioceptive hallucination.

**Reference**

Pontius, A.A. (1977). Somesthetic hallucinations and motility in schizophrenia: Neurophysiological views and information flow model. *Perceptual and Motor Skills*, 44, 79–95.

**Somaesthetic Phantom Double**

see Sensed presence.

**Somatic Hallucination**

Also known as somatosensory hallucination. Both terms are indebted to the Greek noun *sōma*,

which means body. They are used to denote a hallucination that mimics feelings from inside the body, such as sensations in the belly or the limbs. Conceptually as well as clinically, somatic hallucinations are difficult to distinguish from \*tactile hallucinations, bodily feelings arising from somatic conditions, somatic delusions, and \*body schema illusions. A noteworthy example in this respect is inexplicable pain: a textbook example of a feeling that cannot be explained away by calling it a hallucination. Functional magnetic resonance imaging (fMRI) studies indicate that somatic hallucinations are associated primarily with heightened activity in the primary somatosensory cortex, the posterior parietal cortex, and the thalamus. During the era of classic psychiatry, some of the phenomena now referred to as somatic hallucinations were known as \*coenesthetic hallucinations or \*distortions of vital sensations. Another related notion is the \*somaesthetic hallucination. The differential diagnosis of somatic hallucinations includes \*haptic hallucinations, \*body schema illusions, \*paraesthesia, \*alloesthaesia, \*allodynia, \*hyperalgesia, \*hyperpathia, \*hallucinated pain, referred pain, and pain due to an unknown somatic condition. The term somatic hallucination is used in opposition to the term \*tactile hallucination (or haptic hallucination). Together, somatic and tactile hallucinations are referred to in the 1982 *Manual for the Assessment and Documentation of Psychopathology* (AMDP) as \*bodily hallucinations.

**References**

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- Guy, W., Ban, T.A., eds. (1982). *The AMDP-system: Manual for the assessment and documentation of psychopathology*. Berlin: Springer.
- Shergill, S.S., Cameron, L.A., Brammer, M.J., Williams, S.C., Murray, R.M., McGuire, P.K. (2001). Modality specific correlates of auditory and somatic hallucinations. *Journal of Neurology, Neurosurgery and Psychiatry*, 71, 688–690.

**Somatic Tinnitus**

Also referred to as somatosounds. Both terms are used to designate a type of \*tinnitus (i.e. 'ring-

ing in the ears') attributed to a peripheral process outside the ear, such as vascular, muscular, or respiratory processes within the head or neck, or to the temporomandibular joint. The term somatic tinnitus is used in opposition to the terms \*otic tinnitus and \*central tinnitus.

#### Reference

Henry, J.A., Dennis, K.C., Schechter, M.A. (2005). General review of tinnitus. Prevalence, mechanisms, effects, and management. *Journal of Speech, Language, and Hearing Research*, 48, 1204–1235.

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### Somato-Éidolie

The French term *somato-éidolie* is indebted to the Greek words *sōma* (body), and *eidōs* (image, appearance, idea). It translates loosely as somatic eidolia or somatic image. The term is used by the French psychiatrist Henri Ey (1900–1977) to denote “a somatic hallucinatory phenomenon characterized by partial disintegration of the body scheme,” i.e. what is now called a \*body schema illusion.

#### Reference

Ey, H. (1973). *Traité des hallucinations. Tome 2*. Paris: Masson et Cie., Éditeurs.

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### Somatoparaphrenia

Also known as personification anosognosia. The term somatoparaphrenia comes from the Greek words *sōma* (body), *para* (next to, in addition), and *phrēn* (nerve, diaphragm, heart). It was introduced in or shortly before 1942 by the Austrian-American neuropsychiatrist Josef Gerstmann (1887–1969) to denote a disorder of the body image in which a paralyzed body part (usually the left arm or leg, or the left side of the body) is experienced as alien or as belonging to someone else. The British neurologist Macdonald Critchley (1900–1997) cites numerous examples of this condition from the literature, including the following: “Ives and Nielsen’s first patient thought that his paralyzed left arm and leg ‘belonged to someone else’. Zingerle’s male patient had erotic sensations aroused by his own left side which he imagined belonged

to a woman lying beside him. A patient with an embolism of the right middle cerebral artery remembered that in the first days following his stroke he thought his paralyzed leg belonged to the man in the next bed... One of the most extreme cases of somatoparaphrenia concerned a general parietic who sustained a left hypaesthesia. He always lay on his right side, protesting that he had a paralysed brother recumbent beside him and that, disliking this situation, he turned his back on him. Asked to indicate this brother of his, he pointed to his powerless limbs. He would put questions to him... ‘How are you?’ ‘Will you have a cigarette?’ After telling him to lift his left arm, he explained, ‘He doesn’t hear... he doesn’t answer... he has mental paralysis.’” Pathophysiologically, somatoparaphrenia is associated primarily with unilateral (i.e. right-sided) or bilateral lesions of the parietal lobe. Etiologically, it is associated primarily with stroke. Conceptually and phenomenologically, and perhaps also pathophysiologically, this denial of ownership of one’s body parts is related to the notion of the \*altruistic hallucination as conceptualized by the French physician and mesmerist Charles Féré (1852–1907). Paraphrasing the words of the Austrian-American neuropsychiatrist Josef Gerstmann (1887–1969), both syndromes can be said to fall under the heading of “anosognosia which, in addition to the experience of absence, is associated with illusions or distortions concerning the perception of and confabulations or delusions referring to the affected limb or side”.

#### References

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### Somatosensory Aura

Also known as \*somaesthetic aura. The term somatosensory aura comes from the Greek noun *sōma* (body), and the Latin words *sensorium*

(seat of the senses, brain), and *aura* (wind, smell). It is used to denote a type of \*aura consisting of an abnormal somatosensory percept (i.e. a \*somatic hallucination) experienced within a clearly defined region of the body. The most prevalent symptoms of somatosensory auras are \*paraesthesias. Other symptoms, such as pain, \*thermal hallucinations, \*abdominal auras, \*splitting of the body image, and other \*body schema illusions, are less common. As a rule, vague and poorly localized somatosensory percepts are not regarded as somatosensory auras, being relegated to the group of 'unclassifiable auras'.

#### Reference

Lüders, H., Acharya, J., Baumgartner, C., Banbadis, S., Bleasel, A., Burgess, R., Dinner, D.S., Ebner, A., Foldvary, N., Geller, E., Hamer, H., Holthausen, H., Kotagal, P., Morris, H., Meencke, H.J., Noachtar, S., Rosenow, F., Sakamoto, A., Steinhoff, B.J., Tuxhorn, I., Wyllie, E. (1998). Semiological seizure classification. *Epilepsia*, 39, 1006–1013.

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### Somatosensory Hallucination

see Somatic hallucination.

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### Somatosounds

see Somatic tinnitus.

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### Somatotopagnosia

see Autotopagnosia.

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### Sonar Hypothesis

see Human sonar hypothesis of auditory hallucinations.

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### Soul Pain

see Algopsychalia.

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### Soulblindness

see Mindblindness.

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### Sound Phosphene

A term used to denote a type of \*synaesthesia characterized by a transient flash or spark of light (i.e. a \*phosphene) which is triggered by a sudden sound. Sound phosphenes are typically perceived in a dark environment. A special variant is the \*visual sleep start. The term sound phosphene is used in opposition to the terms \*convergence phosphene, \*flick phosphene, and \*movement phosphene.

#### Reference

Harrison, J. (2001). *Synaesthesia. The strangest thing*. Oxford: Oxford University Press.

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### Sound Photism

see Phonopsia.

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### Sound-Colour Synaesthesia

see Colour hearing.

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### Sound-Seeing

see Phonopsia.

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### Space-Motion Hallucination

A term introduced in or shortly before 1951 by the American neurologist Caro W. Lippman (1886–1954) as an umbrella term for various types of \*kinaesthetic hallucination in which the entire body and/or one's surroundings seem to be in motion. Examples of Lippman's space-motion hallucination include 'impressions of various motions of the bed' (exemplified by the \*earthquake), sensations of acceleration, \*slow-motion hallucinations, and \*dead-weight

hallucinations. Because of their association with migraine, space-motion hallucinations may be classified as \*aural phenomena.

#### Reference

Lippman, C.W. (1951). Hallucinations in migraine. *American Journal of Psychiatry*, 107, 856–858.

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### Sparkling

see Hyperchromatopsia.

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### Spectral Illusion

see Illusive conception.

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### Spectre of the Brocken

see Brocken spectre.

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### Specular Autoscopy

Also known as \*specular hallucination. The term specular autoscopy is indebted to the Latin noun *speglum* (mirror) and the Greek words *autos* (self) and *skopeō* (I am looking at). It was introduced in or shortly before 1903 by the French physician and psychologist Paul Auguste Sollier (1861–1933) to denote a type of \*autoscopic hallucination depicting one's exact mirror image. In introducing this term, Sollier sought to replace the older term 'specular hallucination'. He used the term specular autoscopy in opposition to the terms \*dissimilar autoscopy and \*coenesthetic autoscopy. He classified all three phenomena as variants of \*positive autoscopy.

#### Reference

Sollier, P. (1903). *Les phénomènes d'autoscopie*. Paris: Félix Alcan.

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### Specular Hallucination

The term specular hallucination is indebted to the Latin noun *speglum*, which means mirror. It was introduced in or shortly before 1891 by the French physician and mesmerist Charles Féré (1852–1907) to denote an \*autoscopic hallucination depicting the affected individual's exact mirror image, including his or her movements and gestures. As Féré wrote, "It has been proved that the hallucination can consist of an exact animated reproduction like one sees in a mirror; therefore, the name specular hallucination [*hallucination spéculaire*] is the one that strikes me as the most appropriate." Specular hallucinations are sometimes classified as \*reduplicative hallucinations.

#### References

Brugger, P., Regard, M., Landis, Th. (1997). Illusory reduplication of one's own body: Phenomenology and classification of autoscopic phenomena. *Cognitive Neuropsychiatry*, 2, 19–38.

Féré, Ch. (1891). Note sur les hallucinations autoscopiques ou spéculaires et sur les hallucinations altruistes. *Comptes Rendues Hebdomadaires des Séances et Mémoires de la Société de la Biologie*, 3, 451–453.

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### Speed and Hallucinations

see Amphetamine psychosis and amphetamine-induced hallucinations.

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### Spinal Cord-Damage-induced Synaesthesia

A term used to denote a type of \*synaesthesia falling into the class of \*non-idiopathic synaesthesias. In some individuals, a tactile sensation applied above the level of a spinal cord lesion causes a local tactile percept, as well as a sensation in other parts of the body not normally related to the stimulated area. Such phantom sensations are attributed to an artificial synapse located in the vicinity of the lesion. Phenomenologically, spinal cord-damage-induced synaesthesias are related to \*allochiria

and \*allachaesthesia. However, they do not appear to be connected in a pathophysiological sense.

#### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition.* Cambridge, MA: MIT Press.

vividness again and again until it gradually disappeared from sight.”

#### Reference

Spinoza, B. (1995). *The letters.* Translated by Shirley, S. Indianapolis, IN: Hackett Publishing Company.

### Spinoza, Baruch (1632–1677)

Also known as Benedictus de Spinoza, Bento de Espinosa, and Bento d’Espiñosa. An influential Dutch philosopher of Portuguese-Jewish descent. In a letter dating from 1664 to his friend Pieter Balling (d. 1669), Spinoza gave an eloquent description of a \*hypnopompic hallucination he had experienced: “When one morning just at dawn I awoke from a very deep dream, the images which had come to me in the dream were present before my eyes as vividly as if they had been real things, in particular the image of a black, scabby Brazilian whom I had never seen before. This image disappeared for the most part when, to make a diversion, I fixed my gaze on a book or some other object; but as soon as I again turned my eyes away from such an object while gazing at nothing in particular, the same image of the Ethiopian kept appearing with the same

### Spiral

A term introduced in or shortly before 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to denote one of the four \*form-constants of \*geometric visual hallucinations which may occur during the initial stages of mescaline intoxication. Klüver uses the term form constant to denote certain visual forms and elements that “appear in almost all mescal visions”. According to him “many ‘atypical’ visions are upon close inspection nothing but variations of these form-constants.” The examples of the spiral given by Klüver, based on the observations of different test persons, are rendered by him as follows. “‘Upon rhythmical whistling there appears a brown spiral, a wide band, revolving madly around its vertical axis. The band spiral opens and closes as a concertina according to the rhythm of the whistling whereby bright light falls through the intermediate spaces’; ‘a procession, coming from the lower right, moved slowly in spiral turns to the upper left’; ‘wire-like



Fig. 7 Baruch Spinoza

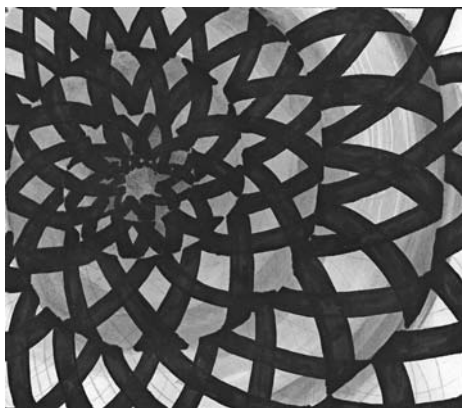


Fig. 8 Spiral with lattice. Illustration by JDB

thin black lines in curves and spirals drawn out.’ Klüver names the remaining three form-constants \*chessboard design, \*cobweb figure, and \*tunnel.

### Reference

Klüver, H. (1966). *Mescal and mechanisms of hallucinations*. Chicago, IL: University of Chicago Press.

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## Spiral Aftereffect

see Spiral motion aftereffect (spiral MAE).

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## Spiral Motion Aftereffect (spiral MAE)

Also known as spiral aftereffect. Both terms are used to denote a \*motion aftereffect that can be induced with the aid of an \*Archimedes’s spiral or \*Plateau’s spiral. After viewing such a rotating spiral for several minutes and then shifting one’s gaze to a stationary object, the object in question will appear to expand or contract, depending on the direction of the spiral’s previous rotational movement. The spiral MAE has been classified by some as a special variant of the \*waterfall illusion. However, it is usually classified as a \*physiological illusion.

### Reference

Mather, G., Verstraten, F., Anstis, S. (1998). *The motion aftereffect: A modern perspective*. Cambridge, MA: MIT Press.

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## Splitting of the Body Image

A term used to denote a rare type of \*somaesthetic aura that is characterized by the sensation of one’s own body being split in two. The affected individual typically perceives his or her body (or head) as being split down the middle, into two halves. The two parts may be perceived as being displaced or separated from each other. Pathophysiologically, splitting of the body image is associated with parietal lesions. Etiologically, it is associated primarily with migraine. The symptom is classified either as a paroxysmal \*body schema disturbance, as a

somatic delusion, or as a \*somatic hallucination. It has also been described as part of the \*Alice in Wonderland syndrome. In a paper published in 2002, the German psychiatrist Klaus Podoll and the migraine art curator Derek Robinson (1928–2001) drew attention to the split body image of Sylvie in the book *Sylvie and Bruno* by Lewis Carroll (1832–1898) and speculated that Carroll may have used a migraine-associated body scheme illusion (possibly one he had experienced himself) as a source of inspiration for this image. Splitting of the body image should not be confused with conditions such as \*autoscopy, \*heautoscopy or \*illusory splitting. Conceptually as well as phenomenologically, it is related to the sensation of anomalous position and remoteness of body parts and with the \*illusory displacement of limbs.

### Reference

Podoll, K., Robinson, D. (2002). Splitting of the body image as somesthetic aura symptom in migraine. *Cephalalgia*, 22, 62–65.

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## Spontaneous Stereognosis Sensation

A term indebted to the medical term stereognosis, from the Greek words *stereos* (solid, tight, compact) and *gnōsis* (insight), meaning the ability to identify solid objects through touch. The term spontaneous stereognosis sensation is used to denote a \*stereognosis (or \*tactile) hallucination mimicking the sensation of an object held in the palm of one’s hand, when the hand is actually empty. The hallucinatory experience may be so vivid that the affected individual feels able to describe the object’s size, shape, texture, and temperature. The occurrence of spontaneous stereognosis sensations is associated primarily with lesions affecting the sensory cortex. They should not be confused with \*allachaesthesia and \*phantom alloaesthesia.

### References

Allen, I.M. (1928). Unusual sensory phenomena following removal of a tumour of the sensory cortex. *Journal of Neurology and Psychopathology*, 9, 133–145.  
 Critchley, M. (1953). *The parietal lobes*. London: Edward Arnold & Co.

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## St. Hildegard

see Hildegard of Bingen.

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## Stabilization Phase

A term used for the – ideal – final reaction type in hallucinating individuals, during which the initial confusion has disappeared, and the person in question has learned to deal with his or her hallucinatory experiences. The stabilization phase is typically preceded by the \*startling phase and the \*organization phase. All three notions were introduced by the Dutch hallucination researchers Marius Romme (b. 1934), and Sandra Escher (b. 1945).

### References

- Romme, M.A.J., Escher, A.D.M.A.C. (1989). Hearing voices. *Schizophrenia Bulletin*, 15, 209–216.
- Romme, M.A.J., Escher, A.D.M.A.C. (1994). *Accepting voices*. London: MIND Publications.
- 

## Stable Hallucination

A term coined in or shortly before 1866 by the German psychiatrist Karl Ludwig Kahlbaum (1828–1899). Kahlbaum uses the term to denote a hallucination which displays a minimum of variation over time. He conceptualizes this type of hallucination as a variant of the \*centripetal type of hallucinations (i.e. \*phantoms in Kahlbaum's jargon). Today the term stable hallucination is used chiefly to denote a \*stereotyped hallucination which arises in the context of a migrainous or epileptic \*aura or in the context of \*hallucinatory epilepsy. In the latter case, hallucinations typically take the form of a \*complex or \*compound hallucination lasting some 10–30 s, recurring at indefinite intervals, with each episode constituting a replica of the previous one.

### References

- Blom, J.D., Sommer, I.E.C. (2009). Auditory hallucinations. *Cognitive and Behavioral Neurology* (in press).

Kahlbaum, K. (1866). Die Sinnesdelirien. *Allgemeine Zeitschrift für Psychiatrie und psychisch-gerichtliche Medizin*, 23, 56–78.

Walter, H., Podreka, I., Steiner, M., Sues, E., Benda, N., Hajji, M., Lesch, O.M., Musalek, M., Passveg, V. (1990). A contribution to classification of hallucinations. *Psychopathology*, 23, 97–105.

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## Stage 2 Nightmare

The term stage 2 nightmare was introduced in or shortly before 1968 by the American sleep researchers Charles Fisher (1908–1988), Joseph V. Byrne, and Adele Edwards. It refers to a type of night terror which may occur during the stage of light sleep, characterized on the electroencephalogram (EEG) by sleep spindles and K complexes. This sleep stage used to be referred to as stage 2 sleep, hence the term stage 2 nightmare. The latter is traditionally used to denote a rather unusual type of night terror, characterized by arousal from stage N2 sleep with anxiety. As noted by the American psychiatrist Ernest Hartmann (b. 1934), the choice of the term stage 2 nightmare is unfortunate, because it falsely suggests a connection with the \*nightmare (which is regarded as different, in a conceptual and phenomenological sense, from night terror). The term stage 2 nightmare is used in opposition to the term \*stage 4 nightmare.

### References

- Fisher, C., Byrne, J.V., Edwards, A. (1968). NREM and REM nightmares. *Psychophysiology*, 5, 221–222.
- Hartmann, E. (1984). *The nightmare. The psychology and biology of terrifying dreams*. New York, NY: Basic Books.
- 

## Stage 4 Nightmare

The term stage 4 nightmare was introduced in or shortly before 1968 by the American sleep researchers Charles Fisher (1908–1988), Joseph V. Byrne, and Adele Edwards. It refers to a common type of night terror which may occur during the stage of deep sleep, characterized on the electroencephalogram (EEG) by delta waves. This sleep stage was formerly referred to as stage 4

sleep, hence the term stage 4 nightmare. The latter is traditionally used as a synonym for the term night terror. As noted by the American psychiatrist Ernest Hartmann (b. 1934), the choice of the term stage 4 nightmare is unfortunate, because it falsely suggests a connection with the \*nightmare (which is regarded as different, in a conceptual and phenomenological sense, from night terror). The term stage 4 nightmare is used in opposition to the term \*stage 2 nightmare.

#### References

- Fisher, C., Byrne, J.V., Edwards, A. (1968). NREM and REM nightmares. *Psychophysiology*, 5, 221–222.
- Hartmann, E. (1984). *The nightmare. The psychology and biology of terrifying dreams*. New York, NY: Basic Books.

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### Startling Phase

A term used to denote the initial reaction of hallucinating individuals, during which the affected individual is typically astonished and confused. In some individuals, the startling phase may never cease. In others, it may be followed by an \*organization phase and a \*stabilization phase, during which the confusion may abate and ultimately disappear. All three terms were introduced by the Dutch hallucination researchers Marius Romme (b. 1934), and Sandra Escher (b. 1945).

#### References

- Romme, M.A.J., Escher, A.D.M.A.C. (1989). Hearing voices. *Schizophrenia Bulletin*, 15, 209–216.
- Romme, M.A.J., Escher, A.D.M.A.C. (1994). *Accepting voices*. London: MIND Publications.

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### Starvation and Hallucinations

see Fasting-induced hallucination.

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### Static Hallucination

The term static hallucination refers to a \*visual hallucination which consists solely of stationary

objects or patterns. It is used in opposition to the term \*moving hallucination.

#### Reference

- Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

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### Statico-kinetic Dissociation

see Riddoch's phenomenon.

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### Stationary Scotoma

A term used to denote a \*scotoma (i.e. an area of loss or impairment of vision) that does not move across the field of vision. The term is used in opposition to the term \*moving scotoma.

#### Reference

- Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.

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### Status Epilepticus Amauroticus

see Ictal blindness.

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### Staudenmaier, Ludwig (1865–1933)

A German professor of experimental chemistry who has been credited with introducing the term \*personification in or shortly before 1912. Staudenmaier used the term to denote 'outward projected' \*compound hallucinations depicting human beings. After an experimental phase in occultism, Staudenmaier was diagnosed with \*schizophrenia in 1918. He had himself experienced hallucinations in the form of personifications, during episodes of so-called automatic writing. As he wrote, "Single hallucinations gradually emerged more definitely and returned more often. At last they formed into *personifications*; for instance, the more important visual images regularly combined with the corresponding auditory images, so that the emerging figures began to speak to me, gave me advice and criticised my actions." Sometimes Staudenmaier's personifications would appear in the form of identical images of his own body, i.e. as



\*autoscopic hallucinations. As he wrote with reference to this latter phenomenon, "During the night while I walked up and down the garden I imagined as vividly as possible that there were three other people present besides me. Gradually the corresponding visual hallucination took shape. There appeared before me three identically clothed Staudenmaiers who walked along in step with me; they stopped when I did and stretched out their hands when I stretched out mine." Staudenmaier interpreted his personifications in Freudian fashion as "emancipated parts of his unconscious". His lectures on 'magic' centred around the notion that whatever is able to receive, must also be able to send. One of his principle aims was to provide future human beings with the necessary tools to produce 'physicalizations' by themselves. The import of Staudenmaier's work for hallucinations research lies in the combination of his first-hand knowledge of hallucinatory phenomena and his exceptional talent for verbalizing and analyzing them. This combination places him in a league with other hallucinating intellectuals, such as Daniel Paul Schreber (1842–1911), Victor Kandinsky (1849–1889), Christoph Friedrich Nicolai (1733–1811), Vaslav Nijinsky (1889–1950), Guy de Maupassant (1850–1893), Fjodor Dostoevsky (1821–1881), and John Thomas Perceval (1803–1876).

#### Reference

Staudenmaier, L. (1912). *Die Magie als experimentelle Naturwissenschaft*. Leipzig: Akademische Verlagsgesellschaft.

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### St Bridgid of Sweden

see Bridget of Sweden.

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### Stereognosic Hallucination

The term stereognosic hallucination is indebted to the medical term stereognosis, from the Greek words *stereos* (solid, tight, compact) and *gnōsis* (insight), meaning the ability to identify solid objects through tactile sensation. The term stereognosic hallucination is used to denote a type of \*tactile hallucination in which one or more solid objects are perceived. A special variant of

the stereognosic hallucination is a phenomenon known as \*spontaneous stereognosic sensation.

#### Reference

Critchley, M. (1953). *The parietal lobes*. London: Edward Arnold & Co.

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### Stereognosic Sensation

see Spontaneous stereognosic sensation.

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### Stereotyped Hallucination

see Stereotypic hallucination.

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### Stereotypic Hallucination

Also known as stereotyped hallucination. Both terms are used to denote a type of hallucination which displays little change and often lacks complexity. As explained by the Swiss psychiatrist Eugen Bleuler (1857–1939), "In general, schizophrenic hallucinations are very prone to become stereotyped. Complex ones become simple. Finally, they may be reduced to one word or one inarticulate sound which confirms his delusions to the patient."

#### Reference

Bleuler, E. (1950). *Dementia praecox or the group of schizophrenias. Monograph series on schizophrenia no. 1*. Translated by Zinkin, J. Madison, WI: International Universities Press.

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### Steroid Psychosis and Hallucinations

The term steroid psychosis, or steroid-induced psychosis, is used to denote a form of \*psychosis mediated by the use of exogenous steroids. The name steroid comes from *sterol* (which refers to a compound of cholesterol). It is used to denote a terpenoid lipid characterized by a carbon skeleton with four fused rings, generally arranged in a 6–6–6–5 fashion. The group of endogenous steroids includes estrogen, progesterone, and testosterone. The term exogenous steroid is used to denote a steroid which is not

synthesized endogenously, but administered for medical, esthetic, or performance-related purposes (see, for example, the entry Anabolic steroids and hallucinations). The use of exogenous steroids is notorious for its many somatic and psychological adverse effects. Among the psychiatric disorders due to the use of exogenous steroids, psychosis is reported to occur in approximately 15% of the cases and \*delirium in approximately 10%. In absolute numbers, steroid psychoses are twice as prevalent in females as in males. After correction for the disorders that have a higher incidence in females, and for which exogenous steroids are given (such as systemic lupus erythematosus and rheumatoid arthritis), the incidence of steroid-induced psychosis in men and women would seem to be roughly equal. The risk of steroid psychosis is dose related, although a dose of 40 mg of prednisone per day or its equivalent has been mentioned as the threshold for an enhanced risk of developing a steroid psychosis. The relation with a prior history of psychiatric disorder is not unambiguous. Traditionally, a history of serious mental illness is considered a relative contraindication for the use of steroids. However, in a review of the literature on steroid psychoses, approximately 20% of the affected individuals had a history of previous psychiatric disorder, while 80% did not. The onset of steroid psychosis tends to be acute. The majority of cases are reported to commence within 6–10 h after the administration of adrenocorticotropic hormone (ACTH) or within 4–6 days after the oral administration of a corticosteroid. Full-blown steroid psychoses are characterized by concentration and attention deficits, memory impairment, formal thought disorder, severe insomnia, hypomania, anxiety, depression, agitation, mutism, delusions, \*hyperacusis, \*body schema illusions, and \*auditory as well as \*visual hallucinations. After the cessation of steroid therapy, spontaneous remittance may take 2 weeks to 7 months, with 80% of the cases reported in the literature having remitted by the sixth week. The administration of antipsychotics tends to shorten the remittance period significantly. The duration of steroid-induced \*delirium is usually shorter. After the cessation of steroid administration, it tends to abate within a week.

#### Reference

Hall, R.C.W., Popkin, M.K., Stickney, S.K., Gardner, E.R. (1979). Presentation of the

steroid psychoses. *Journal of Nervous and Mental Disease*, 167, 229–236.

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### Sthenic Hallucination

The term sthenic hallucination is indebted to the Greek noun *sthenos*, which means force. It was coined in or shortly before 1846 by the French dream researcher Maurice Macario to denote a hallucination that results from a heightened sensibility of the perceptual system. In opting for this term, Macario was seeking to designate such phenomena as the \*visual hallucinations of cogwheels and other parts experienced by watchmakers and the \*auditory hallucinations of cooking sounds familiar to professional cooks. He used the term sthenic hallucination in opposition to \*sensorial hallucination, \*intuitive hallucination, and \*ganglionic hallucination.

#### Reference

Macario, M. (1846). Des rêves considérés sous le rapport physiologique et pathologique. *Annales Médico-psychologiques*, VIII, 170–218.

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### Stimulant Psychosis and Hallucinations

The term stimulant psychosis refers to a type of \*psychosis attributable to intoxication with one or more substances from the group of CNS stimulants (or psychostimulants, as they are also called). Some examples of CNS stimulants are amphetamine, cocaine, dexamphetamine, methylamphetamine, methamphetamine, and methylphenidate. For more detailed information, see the entries Amphetamine psychosis and amphetamine-induced hallucination and Cocaine hallucinosis.

#### Reference

Curran, C., Byrappa, N., McBride, A. (2004). Stimulant psychosis: Systematic review. *British Journal of Psychiatry*, 185, 196–204.

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### Stimulus-Distortion Illusion

see Physical illusion.

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## Strategy Illusion

see Cognitive illusion.

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## Structured Photopsia

A term used to denote a type of \*photopsia (i.e. light flashes) depicting geometric patterns such as circles, squares, hexagonal shapes, etc. The term structured photopsia is used in opposition to \*unstructured photopsia and \*phosphene. Pathophysiology, the mediation of structured photopsia has historically been associated primarily with aberrant neurophysiological activity in presubstriate cortical neurons.

### Reference

Amos, J.F. (1999). Differential diagnosis of common etiologies of photopsia. *Journal of the American Optometric Association*, 70, 485–504.

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## Subjective Colours

see Fechner's colours.

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## Subjective Tinnitus

The term subjective tinnitus refers to a type of \*tinnitus (i.e. 'ringing in the ears') that can only be perceived by the affected individual. The term is used in opposition to the term \*objective tinnitus, which refers to rare type of tinnitus in which an actual sound can be perceived by a third person, emanating from the affected individual's ear. It has been estimated that subjective tinnitus makes up 95% of all cases of tinnitus.

### Reference

Henry, J.A., Dennis, K.C., Schechter, M.A. (2005). General review of tinnitus. Prevalence, mechanisms, effects, and management. *Journal of Speech, Language, and Hearing Research*, 48, 1204–1235.

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## Subvocalization

Also referred to as \*motor hallucination, \*motor verbal hallucination, \*psychomotor verbal hallucination, and \*muscular verbal hallucination. The term subvocalization comes from the Latin words *sub* (beneath) and *vox* (voice). It refers to a process involving subtle instances of motor activity within the larynx and/or vocal cords that may or may not be accompanied by \*verbal auditory hallucinations. The affected individual may even be convinced that he or she is speaking out loud, while this is not the case. As demonstrated by the American psychiatrist Louis N. Gould in 1949, the condition may be accompanied by faint whispers and recordable electromyographical activity in the chin and the lip. In 1966, the American psychologist Frank Joseph McGuigan (1924–1998) succeeded in recording intelligible whispers in instances of subvocalization, using a pair of throat microphones attached to the skin over the larynx. A similar experiment was carried out during the 1980s. The male subject in this latter experiment asserted that the whispers he heard coincided with a hallucinated female voice. For a time, it was hoped that discoveries like these would be exemplary for all auditory hallucinations, but this has not proved to be the case. Experiments such as those by Gould and McGuigan may well have been inspired by the work of the Scottish paranormal researcher John B. M'Indoe (also spelled McIndoe), who used a sensitive telephone transmitter attached to the larynx of a medium in order to demonstrate subvocalization in cases of the \*direct voice phenomenon. Subvocalization is sometimes classified as a variant of the group of \*kinaesthetic hallucinations and sometimes as a variant of the group of \*proprioceptive hallucinations. The French psychiatrist Louis Jules Ernest Séglas (1856–1939), who may well have been the first to describe a similar phenomenon in 1888 under the name \*psychomotor hallucination, classified it as a type of \*verbal hallucination. It is often possible to interrupt voices concomitant to subvocalization by holding one's mouth wide open, holding a small amount of water in the oral cavity, humming a note or speaking out loud.

### References

Gould, L.N. (1949). Auditory hallucinations and subvocal speech: Objective study in a case of

schizophrenia. *Journal of Nervous and Mental Disease*, 109, 418–427.

Green, P., Preston, M. (1981). Reinforcement of vocal correlates of auditory hallucinations by auditory feedback: A case study. *British Journal of Psychiatry*, 139, 204–208.

McGuigan, F.J. (1966). Covert oral behaviour and auditory hallucinations. *Psychophysiology*, 3, 73–80.

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## Succubus

The term succubus comes from the Latin verb *succubare*, which means to lie beneath. It refers to a hag or demon who collects semen by causing nocturnal ejaculations. In demonology the term succubus is used to denote an angel that has fallen and in the guise of a woman seeks sexual intercourse with mortal men while they are asleep. The succubus is the conceptual opposite of the \*incubus, a fallen angel in the guise of a man who seeks sexual intercourse with mortal women. In the past, \*nightmares and sometimes even \*daymares experienced by men were attributed to the interference of succubi, although strictly speaking it is more likely that the nocturnal experiences attributed to succubi were night terrors rather than nightmares. As noted by the German classical scholar Wilhelm Heinrich Roscher (1845–1923), a certain analogy would seem to exist between the succubus of classical and medieval times on the one hand and the \*mare of Germanic superstition on the other.

The belief in succubi and incubi has its roots in ancient times. It has been suggested that the concept itself developed out of pagan speculations about the commerce of gods with people. In old Rabinnical writings, even Adam is described as being visited during a 130-year period by female demons and as having sexual intercourse with them.

## References

Melton, J.G., ed. (1996). *Encyclopedia of occultism and parapsychology. Volume 1. Fourth edition*. Detroit, MI: Gale.

Roscher, W.H. (1972). *Ephialtes. A pathological-mythological treatise on the nightmare in classical Antiquity*. In: *Pan and the nightmare*. Translated by O'Brien, A.V. Edited by Hillman, J. Dallas, TX: Springfield Publications.

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## Suffusio

see Visual aura.

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## Sully's Definition of Illusions

In 1881 the British psychologist James Sully (1842–1923) defined an \*illusion as “any species of error which counterfeits the form of immediate, self-evident, or intuitive knowledge, whether as sense perception or otherwise. Whenever a thing is believed on its own evidence and not as a conclusion from something else, and the thing



Fig. 9 Demonic succubus attacks a sleeping man, by Robin Ray (date unknown)

then believed is demonstrably wrong, there is an illusion. The term would thus appear to cover all varieties of error which are not recognized as fallacies or false inferences.”

#### Reference

Sully, J. (1881). *Illusions: A psychological study*. New York, NY: Humboldt Publishing Company.

### Sun Dog

see Halo.

### Sun Illusion

The term Sun illusion is used to denote the apparent increase in the size of the Sun as observed above the horizon, in comparison with the way it appears in the zenith. The Sun illusion, which is commonly classified as a \*celestial illusion, has been known and described since ancient times. It is traditionally considered a type of \*physical illusion, i.e. an illusion based on the physical properties of the Sun itself and/or the intervening atmosphere. Although today most experts hold that this is not correct, it is still uncertain whether the Sun illusion should be regarded as a \*physiological illusion, a \*cognitive illusion, or – most probably – a combination of the two. The term Sun illusion is used in opposition to the term \*Moon illusion. For a more detailed account of celestial illusions, see the entry Moon illusion.

#### Reference

Ross, H., Plug, C. (2002). *The mystery of the moon illusion. Exploring size perception*. Oxford: Oxford University Press.

### Super Illusion

see Moon illusion.

### Superior Mirage

Also known as arctic mirage. Both terms are indebted to the French verb *se mirer*, which

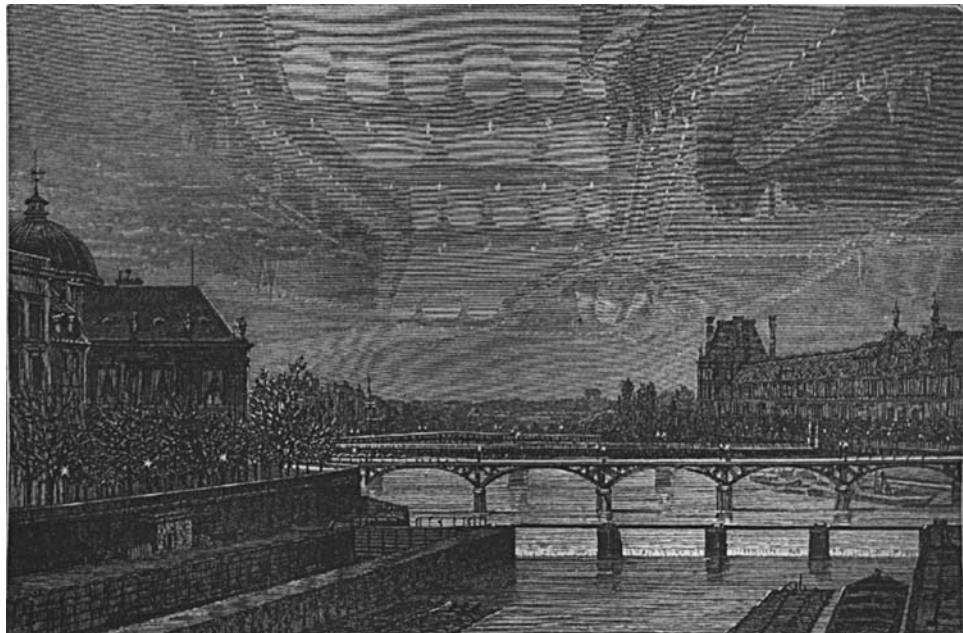
means to reflect or to be reflected. The designation superior refers to the position of the phenomenon relative to the horizon or a distant object. The terms superior and arctic mirage are used to denote a \*physical illusion which has a relative position above the horizon, or a perceived distant object. The resulting image is attributed to the presence of relatively hot air over a cold surface, a condition known as atmospheric temperature inversion. This temperature inversion may be due to the radiative cooling of the earth during the night or to the presence of warm air over a mass of cold water. Superior mirages may present in the form of erect or inverted images, or a mixture of the two, depending on the distance of the perceived object and the temperature gradients involved. Temperature gradients of a relatively high complexity may yield complex distortions. These may be vibrating, vertically extended (i.e. ‘towering’), flattened (i.e. ‘stooping’), etc. A special type of superior mirage, known as the hillingar effect, is characterized by a flat or slightly concave upwards appearance of the earth and horizon. It is attributed to mild, uniform, and widespread temperature gradients. The terms \*fata morgana and \*hafgerdingar are reserved for particularly complex superior mirages, in the former case consisting of spikes and shoots reminiscent of architectural structures or ‘castles in the air’ and in the latter case imitating a circular tidal wave of an impressive height. The vertical spires of fata morganas are attributed to discrete temperature inversions in the air. Two additional types of superior mirage are the Novaya Zemlya, which consists of an impressively distorted, multiple-imaged Sun seen above the horizon after sunset, and the fata bromosa or fairy fog, which consists of a horizontal white band that appears over a water or snow mass in arctic regions. The term superior mirage is used in opposition to the terms \*inferior mirage, \*double mirage, and \*lateral mirage.

#### Reference

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### Supernumerary Bow

see Rainbow.



**Fig. 10** Inverted superior mirage. Source: Flammarion, C. (1873). *The atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

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## Supernumerary Phantom Limb

Also known as reduplication of the phantom. The term supernumerary phantom limb refers to a rare variant of \*phantom limb, consisting of multiple conscious representations of an arm or leg. The condition may be classified either as a \*body schema illusion or as a \*somatic hallucination. Clinically, supernumerary phantom limbs may be experienced after an amputation of one or more limbs and by individuals with a right frontomesial brain lesion who are in possession of all their limbs. In either case it has been suggested that the experience of supernumerary phantom limbs may be mediated by a dissociated conscious perception based on the various properties that the brain attributes to the limb, such as its position in relation to the rest of the body, its posture, and its movement. As a consequence, it has been suggested that the neurophysiological correlate of the supernumerary phantom limb should be sought in the somatosen-

sory cortex and the supplementary motor area (SMA).

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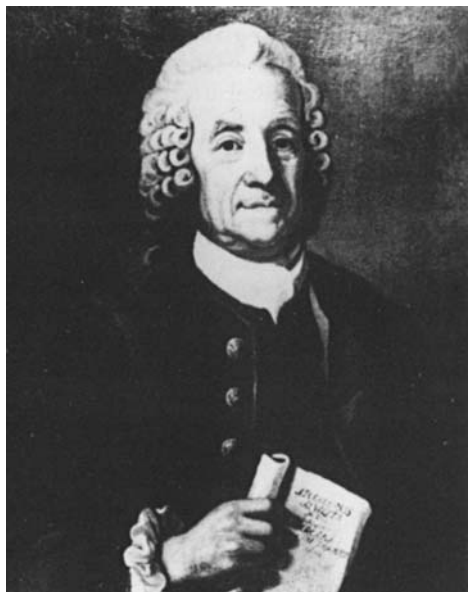
## Surf Bow

see Rainbow.

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## Swedberg, Emanuel

see Swedenborg, Emanuel.



**Fig. 11** Emanuel Swedenborg

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### Swedenborg, Emanuel (born Emanuel Swedberg, 1688–1772)

A Swedish scientist, philosopher, theologian, and mystic, who from 1744 onwards experienced many \*dreams and \*visions which he designated as encounters with angels, demons, and other metaphysical beings. Swedenborg claimed that God had given him free access to Heaven and Hell. Thereupon he resigned his position as the country's leading expert on mining and metallurgy and devoted the rest of his life to the teaching of spiritual enlightenment. Even as a child Swedenborg had the ability to enter into a state of \*trance, and throughout his life he claimed to have \*clairvoyant abilities. The years following his spiritual enlightenment were devoted primarily to writing. He lived an ascetic life and would lie in trance for days on end, meanwhile experiencing excursions to the spiritual world, conversing with angels, and fighting violent battles with evil spirits. During these \*ecstatic states he would seem to have experienced \*external auditory hallucinations (both verbal and nonverbal), \*complex visual hallucinations, \*scenic hallucinations, \*scotomata, \*photisms, \*lilliputian halluci-

nations, \*olfactory hallucinations, \*tactile hallucinations, \*abdominal auras, and probably many other types of hallucination. In addition, he experienced states of \*double consciousness, during which he was able to experience two personae or two different thoughts simultaneously. His extraordinary working pace (which resulted in eight voluminous works in 7 years) may have been due to automatic writing. It has been suggested retrospectively that Swedenborg's visions and trance states were \*ecstatic auras and postictal dissociative episodes occurring in the context of temporal lobe epilepsy, a condition which in his case may have been triggered by a vascular anomaly in the posterior area of the left cerebral hemisphere. It is a well-known fact that he regularly suffered from tonic-clonic seizures and from automatic movements of the mouth, which also supports this hypothesis. In the light of Swedenborg's overall health, his prolific writings, and the coherence thereof, it is unlikely that he suffered from any mental illness.

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### Swift, Jonathan (1667–1745)

An Irish poet, writer, and political satirist who is probably best remembered for his book *Gulliver's Travels*. The description of the miniature and giant figures in this book, referred to as Lilliputians and Gulliverians, as well as the behavioural changes to which the Luggnagians fall prey, have been a source of interest to neurologists ever since the book's publication. The same holds true for Swift's own health problems. It is known that he suffered lifelong symptoms which included intermittent dizziness, nausea, and hearing loss. These symptoms are reminiscent of Ménière's disease and also of migraine-associated dizziness. During the last 3 years of his life Swift suffered from cognitive changes, memory impairment,

personality alterations, a language disorder, and facial paralysis. Retrospectively, his final illness has been variously identified as Pick's disease, Alzheimer's disease, primary progressive aphasia, neurosyphilis, hydrocephalus, post-stroke depression, 'mental illness', and a variety of other disorders, all in keeping with contemporary biomedical insights. It has been speculated that the miniature and giant figures in *Gulliver's Travels* were inspired by \*visual (i.e. \*lilliputian and \*gulliverian) hallucinations which Swift may have experienced himself. However, despite 250 years of retrospective diagnostics, the nature of his various illnesses is still uncertain.

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### Swimmer's Bow

see Rainbow.

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### Symptomatic Autoscopia

The term symptomatic autoscopia comes from the Greek words *sumptōma* (chance, disease), *autos* (self), and *skopeō* (I am looking at). It is used to denote a type of \*autoscopia (i.e. 'seeing oneself') which is attributable to an organic disorder. The term is used in opposition to \*idiopathic autoscopia. For a further explanation, see the entries Autoscopia, Autoscopic phenomenon, and Autoscopic hallucination.

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### Synaesthesia

Also known as synesthesia, synaesthetic hallucination, synaesthetic experience, reflex false perception, secondary sensation, and secondary sense perceptions (German: *sekundären Sin-*

*nesempfindungen*). The term synaesthesia comes from the Greek words *sun* (together, unified) and *aisthanesthai* (to notice, to perceive). It translates loosely as 'joined sensation'. The coiner of the term synaesthesia is unknown. At least from the late 19th century onwards, it has been used to denote either a hallucination that does not tally with the sensory modality in which it is experienced (i.e. what is more properly referred to as an \*extracampine hallucination) or a hallucinated secondary percept which is triggered by a sense perception in a different sensory modality (for example, a hallucinated patch of blue which is triggered by the sound of a clarinet). The person usually credited with the first reference to synaesthesia is the British empiricist philosopher John Locke (1632–1704). In his 1693 *Essay Concerning Human Understanding*, Locke recounts the story of a blind man who associated the colour scarlet with the sound of a trumpet. But the man who actually opened up the scientific study of synaesthetics is the Austrian philologist F.A. Nussbaumer, who in 1873 described a systematic association between colours and musical tones (i.e. \*coloured music) which he and his brother had experienced since childhood. Phenomenologically, the group of synaesthetics is extremely diverse. On the basis of the work of the Hungarian-Dutch experimental psychologist Géza Révész (1878–1955), three broad classes can be distinguished: \*perceptual synaesthetics, in which the secondary percepts (i.e. hallucinations) are actually perceived, \*conceptual synaesthetics (in which the secondary percepts are envisaged in the form of an ideated sensation), and \*mental synaesthetics (in which the secondary percept comes to mind when its name is suggested). The expression synaesthesia has traditionally been applied to hallucinations occurring simultaneously with – or in close succession to – regular sense perceptions, but in a different sensory modality. The following definition, borrowed from the German psychiatrist Johannes Stein (1871–1951), captures the phenomenon in its classic sense: "We speak of a synaesthesia when stimulation of one sense organ evokes a response not only from this one, but also from a sense organ which was not directly stimulated." Examples of this phenomenon are tastes accompanied by visual hallucinations (\*taste-photisms, or taste-chromatisms) and colours followed by music (\*light-phonisms). The most conspicuous phenomenon within this class is \*colour hearing, i.e. a visual sensation triggered by an auditory



stimulus. A second sense in which the term synaesthesia is used is when voices are heard within the knee or the stomach, for example, as if they were functioning as an acoustic organ. Examples of this type of synaesthesia can be found in many classic textbooks of psychiatry. The German neurologist Carl Wernicke (1848–1904), for example, reports on \*phonemes experienced inside the trunk, a leg, and a boot. The German psychiatrist and neurologist Georg Theodor Ziehen (1862–1950) describes various cases of voices heard within a neuralgic part of the thorax, and one patient who experienced visual hallucinations inside the thorax. The Swiss psychiatrist Eugen Bleuler (1857–1939) drew up a whole list of such phenomena, including voices in the abdomen, the womb, the penis, the urine in a person's bladder, and in a polyp on a person's nose. Bleuler was also the one who introduced the apter term extracampine hallucination to designate these phenomena. The reason why phenomena such as a voice 'heard' by the knee or the thigh have often been included in the group of synaesthetics is that their genesis is considered more or less similar. The Heidelberg psychiatrist Hans Walther Gruhle (1880–1958), for instance, explains a voice 'heard by' the thigh as follows: "The explanation must be that we are dealing here with synaesthetics in the – not entirely correct – sense that the patient has a sensation in the thigh, for example, at the very moment of hearing a voice, and now both sensations fuse in such a way that he identifies them topically." Current diagnostic criteria of synaesthetics, as issued by the American neurologist and synaesthesia expert Richard Cytowic, state that cases of synaesthesia are always involuntary, that they involve the 'outward projection' of the secondary percept (rather than their being imagined), that the associations are consistent and discrete, that they are easily remembered, and that they are accompanied by an unshakable conviction and sense of validity. The terms \*idiopathic and \*developmental synaesthesia are used to denote synaesthetics occurring in the absence of any demonstrable pathology. This type of synaesthesia tends to occur in healthy individuals from birth or early youth onwards. Synaesthetics occurring in the context of overt pathology are referred to as \*non-idiopathic synaesthetics. This latter group includes \*drug-induced synaesthetics, \*epileptic synaesthetics, \*brain-damage-induced synaesthetics, and \*spinal cord-damage-induced synaesthetics. As in all types of hallucination, synaes-

thetics can sometimes be of use to the individual experiencing them. Reportedly, the German Egyptologist Karl Lepsius (1810–1884) employed his \*chromatisms as a guide in his philological inquiries. The British scientist Sir Francis Galton (1822–1911) describes the case of a woman who made use of the colours associated with the letters of the alphabet when she had difficulty with the spelling. And Wassily Kandinsky (1866–1944), the Russian expressionist painter, employed his synaesthetics in designing performances which combined colour and music, in collaboration with the composer Alexander Scriabin (1872–1915). Reportedly, Scriabin and his compatriot Rimsky-Korsakov (1844–1906) were also familiar with synaesthetics. As to the prevalence of synaesthetics in the general population, estimates vary significantly: Cytowic came up with a point prevalence of 1 in 20,000, the British neuroscientists Simon Baron-Cohen et al. made it 1 in 2,000, and Galton's estimate was 1 in 20. Starting with Galton, the propensity to experience synaesthetics has been associated with heritability. Linkage analyses and population studies have confirmed that this is the case for the idiopathic types of synaesthesia. As to the neurophysiological correlates of synaesthetics, four major hypotheses exist. The best known of these is perhaps the cross-activation hypothesis, which suggests that perceptual information from one sensory modality may cross over into another. Competing models attribute the mediation of synaesthetics to disinhibition between adjacent brain areas, to an increase in feedback connections between successive stages of the sensory hierarchy, and to excess activity between these successive stages, for example as a result of a disinhibition of feedback connections. Conceptually, the notion of synaesthesia shows certain similarities to other cross-activation symptoms, such as the \*functional hallucination and the \*reflex hallucination (both terms referring to hallucinations evoked by a regular sense perception), the \*Tullio phenomenon (involving the occurrence of vestibular phenomena in response to auditory stimuli), and the Proust phenomenon (involving odours evoking autobiographical memories, named after the French author Marcel Proust (1871–1922)). The term \*pseudosynaesthesia is used to denote metaphorical references reminiscent of synaesthetics. Today synaesthetics enjoy something of a cult status among people calling themselves synaesthetes, who exchange experiences at conferences and via the internet.

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**Synaesthesia Algica**

see Synaesthesialgia.

**Synaesthesialgia**

Also known as synesthesialgia, synaesthesia algica, and synesthesia algica. All four terms stem from the Greek words *sun* (together, unified), *aisthanesthai* (to notice, to perceive), and *algos* (pain). They refer to a painful sensation which gives rise to a secondary painful sensation that has no objectifiable substratum. Whether the secondary painful sensation should be conceptualized as a type of \*hallucinated pain or rather as a type of referred pain may not always be clear. The term synaesthesialgia is also used to denote a condition in which a stimulus produces pain on the affected side of the body, but a pleasant one – or none at all – on the healthy side. A third meaning is ‘painful synaesthesia’. In the latter case, the term refers to a painful sensation which may be triggered by a sudden sound or light stimulus.

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**Synaesthetic Configuration**

The term synaesthetic configuration comes from the Greek words *sun* (together, unified) and *aisthanesthai* (to notice, to perceive), and from the Latin verb *configurare* (to adjust, to render a similar form). It is used to denote a type of \*synaesthesia which is characterized by colours, spatial patterns, or forms which may be triggered by multiple concepts such as numbers, days of the week, history patterns, etc. The group of synaesthetic configurations includes the \*number forms, the \*grapheme-colour synaesthesias, and so-called memory maps.

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**Synaesthetic Experience**

see Synaesthesia.

**Synaesthetic Hallucination**

see Synaesthesia.

**Synchiria**

Also known as diplohaptia. The term synchiria comes from the Greek words *sun* (together) and *cheir* (hand). It was introduced in or shortly before 1907 by the Welsh neurologist and psychoanalyst Alfred Ernest Jones (1879–1958) to denote a disorder of tactile function in which unilateral tactile stimulation produces bilateral tactile sensations. Conceptually as well as phenomenologically, synchiria is considered a variant of \*allchaesthesia and \*allochiria. It should not be confused with \*phantom alloaesthesia.



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**Syndrome of Alice in Wonderland**

see Alice in Wonderland syndrome.

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**Syndrome of Doubles of the Self**

see Syndrome of subjective doubles.

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**Syndrome of Floating Experience**

see Out-of-body experience (OBE or OBEE).

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**Syndrome of Subjective Doubles**

Also referred to as syndrome of doubles of the self. Both terms were introduced in or shortly before 1978 by the Greek psychiatrist George N. Christodoulou to denote a subgroup of the \*misidentification syndrome in which the affected individual is under the illusory or delusional impression that one or more others have taken over his or her physical characteristics. In the original article on the subject, Christodoulou describes an 18-year-old woman who reported that “a female neighbour had succeeded, by means of elaborate transformations, in acquiring physical characteristics identical with her own (‘same face, same build, same clothes, same everything’). She believed that this woman had used special makeup, a wig, and a mask, and characterized this transformation as a ‘metamorphosis’.” According to Christodoulou, the woman claimed that she had seen at least two females being transformed into her own self. A subdivision of the syndrome of subjective doubles yields a ‘Capgras type’ (characterized by the delusional conviction that unseen doubles are active in the affected individual’s environment), an ‘autoscopic type’ (in which doubles of the self are perceived, ‘projected’ onto other people or objects, as in \*pareidolia), and a ‘reverse type’

(in which the affected individual believes to be an impostor or to be about to be replaced by someone else). The syndrome of subjective doubles is associated with various psychiatric disorders (notably the group of so-called \*schizophrenia spectrum disorders) and neurological disorders (notably disorders of the right parieto-temporal lobe). Conceptually and phenomenologically, the syndrome of subjective doubles constitutes the counterpart of a syndrome called \*mirrored self-misidentification, in which the affected individual is unable to identify his or her mirror image as oneself. The syndrome of subjective doubles also displays certain similarities to \*Frégoli’s phenomenon, the \**Doppelgänger*, and \*autoscopic phenomena.

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**Synesthesia**

see Synaesthesia.

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**Synesthesia Algica**

see Synaesthesialgia.

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**Syphilis and Hallucinations**

see Syphilitic hallucinosi.

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**Syphilitic Hallucinosi**

The term syphilitic hallucinosi is used to denote a hallucinatory state attributable to syphilis. The medical Latin name syphilis comes from the Latin *sus* (swine), and the Greek *philos* (friend of). It was introduced in a medical didactic poem entitled *Syphilis sive de morbo Gallico* (i.e. Syphilis or on the French disease), published in 1530 by

the Italian physician Girolamo Fracastoro (1478–1553). Syphilis is also known as lues, lues venerea, Cupid's disease, pox, great pox, the Grandgore, French disease, Frank disease, Italian disease, British disease, Spanish disease, and Polish disease. All these names are used to denote an infectious disease caused by the spirochete *Treponema pallidum*. Syphilis tends to be transmitted sexually, but it may also be transmitted via open wounds, or, in utero, from mother to unborn child. The disease process follows three developmental stages, known as primary, secondary, and tertiary syphilis. The relatively symptom-free episodes in between are known as latent syphilis. Primary syphilis tends to occur 10–90 days after the initial exposure. It is characterized by one or more local skin lesions, referred to as chancres. Secondary syphilis tends to follow 1–6 months after the initial exposure. It may present in the form of a rash on the palms of the hands and the soles of the feet, condylomata acuminata, general malaise, fever, weight loss, lymphadenopathy, etc. Tertiary syphilis may occur anywhere from 1 to 50 years after the initial exposure. This stage is characterized by the formation of gummata and granulomata. When these affect the CNS, they may cause neurological complications such as tabes dorsalis, Argyll Robertson pupil, and neurosyphilis. Neurosyphilis is also known as neurolues, dementia paralytica, paralytic dementia, parietic psychosis, blaesus, Bayle disease, general paresis, general paralysis, and general paralysis of the insane (GPI). It has been estimated that near the end of the 19th century some 15% of the inhabitants of Paris were infected with syphilis. Today it is a relatively rare condition. Syphilitic hallucinosis is even rarer, occurring in 10–20% of the cases of syphilis. Although reported mainly in conjunction with tertiary syphilis, it may occur during any stage of the disease. However, it has been suggested that hallucinations which occur during the primary and secondary stages of syphilis should probably be attributed to comorbid disorders such as alcoholism, substance abuse, or \*schizophrenia. The pathophysiology of true syphilitic hallucinosis is as variable as that of \*Aids. Due to the consid-

erable variety of possible lesion sites, the ensuing hallucinations may also vary considerably. Nevertheless, \*auditory hallucinations are considered the most prevalent type, followed by \*visual hallucinations. In 1913 the German psychiatrist Felix Plaut (1877–1940) published a retrospective study of 713 cases of syphilis. Auditory hallucinations were the most common type in the study. These included many cases of \*musical hallucinations, \*tinnitus, and other \*nonverbal auditory hallucinations. \*Verbal auditory hallucinations and \*hyperacusis were also reported, and, less frequently, visual hallucinations. Whenever present, visual hallucinations (as well as \*olfactory and \*bodily hallucinations) tended to combine with the auditory ones to form \*compound hallucinations. As a nosological category, syphilitic hallucinosis is classified as a specific type of \*hallucinosis syndrome.

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### Syrigmus

see Tinnitus.

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### Systematized Anaesthesia

see Total anaesthesia.

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## Tachypsychia

The term tachypsychia comes from the Greek words *tachos* (swiftness) and *psuchè* (life breath, spirit, soul, mind). It translates loosely as 'rapid mind' or 'fast psyche'. The term is used to denote an altered perception of time in which it is experienced as either speeded up or slowed down. Tachypsychia has been described chiefly under extreme circumstances such as physical exhaustion, extreme stress, and trauma. In addition, it has been described in the context of \*aurae (as in paroxysmal neurological disorders such as migraine and epilepsy), and following the use of psychotomimetic substances such as LSD, cannabis, and mescaline. It has been suggested that the occurrence of tachypsychia is governed by the sudden release of neurotransmitters such as dopamine and catecholamines. Tachypsychia is classified as a specific type of dyschronation or \*time distortion. When there is a significant increase in the speed of psychological time, the term \*quick-motion phenomenon applies. A significant decrease in the speed of psychological time is called \*protracted duration. See also the entry Slow-motion hallucination.

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## Tactile Allodynia

see Allodynia.

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## Tactile Hallucination

Also known as tactile phantasma, haptic hallucination, touch hallucination, and hallucination of touch. The term tactile hallucination is indebted to the Latin verb *tangere*, which means to touch. It refers to a bodily sensation seemingly evoked by a stimulus from outside the body (such as a pat on the shoulder, a blow to the head, or a stab in the back) which occurs in the absence of an appropriate source in the extracorporeal environment. The above terms are used in opposition to the term \*somatic hallucination, which is reserved for a hallucination of bodily sensations that would seem to come from inside the body. Together, tactile and somatic hallucinations are referred to as \*bodily hallucinations. Historically, tactile hallucinations have been divided mainly in accordance with the type of sensation evoked. Thus the term \*stereognosis hallucination is used to denote a type of tactile hallucination in which

one or more solid objects are perceived, and the term \*spontaneous stereognosis to denote a tactile hallucination mimicking the feeling of an object held in the palm of one's hand, while the hand is actually empty. The term \*hygric hallucination is used to denote the hallucinated sensation of water, experienced in the tactile modality. When tactile hallucinations mimic the feeling of bugs crawling upon or beneath the skin, they are designated as \*formicative hallucinations. Drug-induced variants of formication are known under the names \*cocaine bugs, \*Magnan's sign, Magnan-Saury's sign, and \*crank bugs. Tactile hallucinations experienced in erogenic zones are referred to as \*genital or \*sexual hallucinations. The complete inability to feel one's body is designated as \*acnesthesia, whereas painful sensations attributed to hallucinatory activity are referred to as \*hallucinated pain. Some of the sensory deceptions experienced in the tactile modality should perhaps be classified as tactile illusions rather than hallucinations. Some examples are \*tactile polyesthesia (in which a single tactile stimulus is at first perceived and localized properly, and then perceived again in one or more improperly localized places), \*allachesthesia (i.e. a mislocation of tactile sensations), \*phantom allosthesia (i.e. a tactile sensation perceived below the stump of an amputated limb, following stimulation of the remaining – contralateral – limb), and \*allochiria (i.e. a mislocation of sensory stimuli to the corresponding opposite half of the body). Pathophysiologically, tactile hallucinations are associated primarily with aberrant neurophysiological activity in sensory cortical areas representing the skin and subcutaneous tissues. In clinical practice, it is not always easy to distinguish them from other somatosensory phenomena. The differential diagnosis of tactile hallucinations includes such diverse phenomena as somatic hallucinations, hallucinated pain, \*sensed presence, \*distortions of vital sensation, \*coenesthetic hallucinations, \*body schema illusions, \*paraesthesiae, \*alloesthesia, \*allodynia, \*hyperaesthesia, \*hyperalgesia, \*hyperpathia, referred pain, and actual parasitosis.

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## Tactile Insensitivity

The term tactile insensitivity is indebted to the Latin verb *tangere*, which means to touch. It was introduced in or shortly before 1995 by the American psychologists Arien Mack (b. 1931) and Irvin Rock (1922–1995) to denote a failure to consciously perceive an above-threshold tactile stimulus, due to the fact that the observer's focus of attention is elsewhere. A typical setting in which tactile insensitivity can occur is a distraction task, i.e. a setting where a test person is asked to identify a certain tactile stimulus (such as the drawing of a letter B on the forearm), and is simultaneously presented with an unexpected, and quite different tactile stimulus (such as a drop of water falling on the other arm). The phenomenon itself has been described in the medico-psychological literature at least since the era of mesmerism. In the 19th-century hypnotist tradition, inattentiveness constitutes one of the explanatory models for the mediation of \*negative hallucinations. It has also been suggested that tactile insensitivity may be related in a conceptual and phenomenological sense to hypnotically induced \*analgesia, and \*anaesthesia. A related phenomenon, which may occur in the visual modality, is called \*inattentional blindness. When occurring in the auditory modality, the term \*inattentional deafness is used. Yet another related phenomenon is \*change blindness.

## References

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- Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

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## Tactile Phantasma

A term used in the older (i.e. pre-esquirolian) literature to denote what is now commonly called a \*tactile hallucination.

### Reference

Müller, J. (1826). *Ueber die phantastischen Gesichterscheinungen*. Koblenz: Hölscher.

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## Tactile Polyesthesia

Also known as palihaptic phenomenon, palinaesthesia, and perseverative somaesthetic sensation. The term tactile polyesthesia comes from the Latin verb *tangere* (to touch), and the Greek words *polus* (much, many), and *aisthanesthai* (to notice, to perceive). It is used to denote an illusory tactile phenomenon in which a single tactile stimulus is at first perceived and localized properly, and then perceived again, a few seconds later, in one or more different parts of the body. The Austrian-American neurologist Paul Ferdinand Schilder (1886–1940) gives the example of a woman who, when touched on the right side near the breast, perceives the stimulus successively on the shoulder, near the elbow, on the upper part of the leg, and on the foot, whereby the duration of the intervals between these various tactile sensations is of the order of seconds. Pathophysiologically, tactile polyesthesia is associated primarily with discrete lesions affecting the parietal cortex. Conceptually, the phenomenon is analogous to \*palinopsia (i.e. the persistence or recurrence of visual images), and \*palinacsis (i.e. the persistence or paroxysmal recurrence of auditory percepts). Tactile polyesthesia tends to be classified as a \*reduplicative phenomenon.

### References

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## Take-Away Apparition

Also known as deathbed apparition and deathbed escort. All three terms are used to denote human, humanoid, or mythological beings, often seen in a radiant light, which may appear in a \*deathbed vision. The term take-away apparition stems from the parapsychological literature. It designates the alleged function of the perceived beings in summoning or escorting the dying person towards the afterlife. According to the American parapsychologist Raymond A. Moody, Jr. (b. 1944), the seeing of deceased relatives or other persons, as well as the seeing of religious or mythological creatures, is a common feature of \*near-death experiences (NDEs). They are designated as \*afterlife-related hallucinations or \*hallucinatory near-death experiences. According to the parapsychologists Karlis Osis (1917–1997) and Erlendur Haraldsson (b. 1931), the dying individuals' predominant reaction to take-away apparitions is one of serenity and peace, religious emotion, and \*ecstatic feelings. To suspend judgment on the issue of whether take-away apparitions exist or not, it has been proposed to use the neutral term \*idionecrophany to denote any sensory experience that involves an alleged contact with the dead. It has also been suggested that the experience of a 'clear light of death' may be associated with the massive release of the neurotransmitter dimethyltryptamine (DMT).

### References

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- Moody, R.A. (1975). *Life after life*. New York, NY: Bantam Books.
- Osis, K., Haraldsson, E. (1977). *At the hour of death*. New York, NY: Avon Books.
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## Tanzi's Definition of Hallucinations and Illusions

In 1905 the Italian psychiatrist Eugenio Tanzi (1856–1934) defined hallucinations and \*illusions as follows. "By an hallucination is meant the occurrence of internal images, which, on account of their remarkable vividness, are referred externally as if they had come from without, and which



are mistaken for an objective reality. By illusion is meant the involuntary process by which imaginary attributes are added to an existing object, under the conviction that they are real, or, at least, with the feeling that they may be so."

### Reference

Tanzi, E. (1909). *A text-book of mental diseases*. Translated by Ford Robertson, W., Mackenzie, T.C. London: Rebman Limited.

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## Taraxein and Hallucinations

The name taraxein comes from the Greek verb *tarassein*, which means to confuse, to disturb. It was introduced in or shortly before 1957 by the American psychiatrist and neurologist Robert Galbraith Heath (1915–1999) and his team at Tulane University, New Orleans, to denote a serum protein fraction of the blood of individuals with a clinical diagnosis of \*schizophrenia. It was speculated at the time that this serum protein fraction constitutes a potent endogenous toxin, capable of evoking \*psychotic symptoms in nonpsychotic individuals when injected intravenously. Its alleged effects were initially established in animal studies with monkeys (who reportedly displayed motor behaviour reminiscent of catatonia, and changes on the electroencephalogram (EEG) indicative of limbic pathology), and spiders of the species *Zilla-X-notata* (which, upon having been fed taraxein stuffed inside the dried abdomen of a fly, reportedly built webs with a rudimentary structure designated as 'catatonic' in nature). Over the years taraxein was administered to numerous species of animals, including the tadpole, the larvae of *Xenopus levis*, the larvae of *Rana temporaria*, and the isolated frog's heart, where it was reported to cause toxic effects of varying nature. When tested in a group of prisoner volunteers and four physicians, the group of Heath noted that "all human subjects in this series who received active taraxein displayed symptoms indicating disturbances in the boundaries of the self. All exhibited fundamental symptoms of schizophrenia, as described by Bleuler, and within the group a wide variety of accessory symptoms were manifest. In reviewing this series, we note that 5 of the 35 subjects described overt hallucinatory experiences. All had auditory hallucinations which in no way differed in character from those seen in patients diagnosed as unde-

niably schizophrenic. No visual hallucinations resulted from the administration of taraxein." Because of the effects reported by the group of Heath and others, it was speculated that taraxein might be the famous 'toxin X' or 'neurotoxin' postulated by authorities such as Emil Kraepelin (1856–1926) and Carl Gustav Jung (1875–1961) as the biochemical cause of dementia praecox or schizophrenia. Comparisons were made between taraxein and \*hallucinogens such as mescaline and LSD, and expectations as to its potential to help unravel the etiology of the major psychotic disorders were running high. However, the success rate of the taraxein studies declined over time, and ultimately the validity of the taraxein phenomenon was called into question.

### References

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- Malis, G.Yu. (1959). *Research on the etiology of schizophrenia*. Translated by Haigh, B. Edited by Wortis, J. New York, NY: Consultants Bureau.

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## Taste Chromatism

Also known as taste photism. Both terms are used to denote a type of \*synaesthesia characterized by a hallucinated colour sensation (i.e. a \*chromatism or \*photism) which is triggered by a regular gustatory percept (taste).

### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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## Taste Disorders

see Chemosensory disorders.

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## Taste Hallucination

see Gustatory hallucination.

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## Taste Illusion

see Gustatory illusion.

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## Taste Phonism

A term used to denote a type of \*synaesthesia characterized by a hallucinated sound (i.e. a \*phonism) triggered by a regular gustatory percept (taste).

### Reference

Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition.* Cambridge, MA: MIT Press.

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## Taste Photism

see Taste chromatism.

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## Teichopsia

Also known as \*fortification spectrum, fortification figure, \*fortification of Vauban, geometrical spectrum, herringbone, Norman arch, \*scintillating scotoma, and fluttering scotoma. The term teichopsia comes from the Greek words *teichos* (wall), and *opsis* (seeing). Its introduction is attributed to the British physician Hubert Airy (1838–1903). Today it is used to denote a \*geometric visual hallucination consisting of an extremely bright, sometimes coloured, zigzag line or ‘fortification wall’, which may begin near the fovea in one hemifield, and then spread out towards the periphery of the hemifield without touching the vertical meridian. For a further

description of this phenomenon, see the entry Fortification spectrum.

### References

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- Wilkinson, F. (2004). Auras and other hallucinations: Windows on the visual brain. *Progress in Brain Research*, 144, 305–320.

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## Telehopsia

see Fortification spectrum.

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## Teleologic Hallucination

The term teleologic hallucination is indebted to the Greek words *teleios* (to have reached its fulfillment), and *logos* (word, teaching). It was coined by the Swiss psychiatrist Eugen Bleuler (1857–1939) to denote a hallucination that involves a warning or advice designed to prevent the subject from carrying out a potentially harmful act.

### Reference

Bleuler, E. (1923). *Lehrbuch der Psychiatrie. Vierte Auflage.* Berlin: Verlag von Julius Springer.

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## Teleopsia

Also known as teliopsia and \*telopsia. All three terms stem from the Greek words *tèle* (far), and *opsis* (seeing). The term teleopsia was introduced in or shortly before 1949 by the British neurologist Macdonald Critchley (1900–1997) to denote a visual distortion in which objects appear to be either further away, or closer than they actually are. The phenomenon itself has been described at least as far back as 1916, judging by its description *avant la lettre* by the British neurologist Samuel Alexander Kinnier Wilson (1878–1937). Teleopsia may present either as an isolated

symptom or as part of a cluster of symptoms called the \*Alice in Wonderland syndrome. Etiologically, it is associated primarily with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy, and with the use of \*hallucinogens such as LSD and mescaline. Teleopsia is classified either as a \*dysmetropsia or a \*metamorphopsia. Sometimes the term \*porropsia is used as a synonym, although phenomenologically the two symptoms are not identical (porropsia being defined as a condition in which stationary objects are perceived as receding into the distance). Nor should teleopsia be confused with \*micropsia, a visual distortion in which objects and stimuli are perceived as smaller, but not necessarily as further away. Today the term *telopsia* is commonly used to denote the condition in which objects appear to be further way.

### References

- Critchley, M. (1949). Metamorphopsia of central origin. *Transactions of the Ophthalmologic Society of the UK*, 69, 111–121.
- Ey, H. (2004). *Traité des hallucinations. Tome 1*. Paris: Claude Tchou pour la Bibliothèque des Introuvables.
- Klee, A., Willanger, R. (1966). Disturbances of visual perception in migraine. *Acta Neurologica Scandinavica*, 42, 400–414.
- Wilson, S.A.K. (1916). Dysmetropsia and its pathogenesis. *Transactions of the Ophthalmological Society UK*, 36, 412–444.

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## Telepathic Hallucination

The term telepathic hallucination is indebted to the term telepathy, which in turn stems from the Greek words *tèle* (far, distant), and *pathe* (occurrence or feeling). The term telepathy was introduced in or shortly before 1882 by the British classical scholar, writer, and poet Frederic Myers (1843–1901) to denote what he called “a transmission of thought independently of the recognized channels of sense”. In parapsychology the term telepathic hallucination is used to denote a type of hallucination, often visual or auditory in nature, which is supposedly conveyed by an external source. When telepathic hallucinations are believed to occur simultaneously with an actual event in the external world, they are referred to as \*coincidental hallucinations. When their con-

tent is believed to be identical to an actual event in the external world, they are called \*veridical hallucinations. In spite of the use of the adjective telepathic, there have been objections to the fact that the term telepathic hallucination still has a certain connotation of subjectivity or morbidity related to the term hallucination. In an attempt to do away with that connotation, it has been proposed to replace the term telepathic hallucination by \*monition. In their \*Census of Hallucinations, the Society for Psychical Research (SPR) recognized hallucinations as being telepathic in nature when the \*hallucinator provided testimony of a formal relation between it and an actual event in the external world (usually another person being severely ill or dying). In addition, testimony was required which documented the occurrence of the hallucination within a time frame of 12 hours before or after the event in question. Where possible, the SPR collected additional testimonies corroborating the test person's reports. However, as pointed out by critics such as Edmund Parish (1861–1916) and Donald James West (b. 1924), mere testimonies are insufficient proof of the alleged temporal and formal relations between hallucinations and actual events. Nevertheless, it would seem that attempts are still being made to differentiate between pathological and telepathic hallucinations. For example, in 1997 the British researchers Mike Jackson and Bill Fulford advocated the development of criteria which would enable physicians to make a distinction between hallucinations with a pathological origin, and hallucinations with a spiritual origin. Another example comes from the U.S. government, which from the 1970s through 1995 spent millions of dollars on the Stargate Program, designed to evaluate the usefulness of \*remote viewing for purposes of military intelligence.

### References

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## Teleplasm

see Ectoplasm.

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## Telesthesia

see the entries Remote viewing, and Clairvoyance.

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## Television-Induced Hallucination

The notion of television-induced hallucination refers to a type of hallucination uniquely provoked by television viewing. This type of hallucination is believed to be extremely rare. The first case report of hallucinations co-occurring with television viewing was published in 1976 by the Australian neurologist James Waldo Lance (b. 1926). The first case report of hallucinations co-occurring *exclusively* with television viewing was published in 1981 by the Swiss neuro-ophthalmologists Avinoam B. Safran et al. Both case reports involve \*complex visual hallucinations. They were attributed to a preceding cerebral infarction complicated by epilepsy. Pathophysiologically, television-induced hallucinations are associated primarily with photic or photosensitive epilepsy, i.e. with flicker-induced focal epileptic seizures affecting either the occipital cortex (when \*simple visual hallucinations are involved) or the temporal lobe (when \*complex visual hallucinations are involved). In 1952 the American paediatrician Samuel Livingston (1908–1984) provided the first case report of television-induced epilepsy. Television-induced hallucinations may be classified as a special type of \*photically induced hallucination. They should not be confused with the \*TV sign.

### References

- Lance, J.W. (1976). Simple formed hallucinations confined to the area of a specific visual field defect. *Brain*, 99, 719–720.
- Livingston, S. (1952). Comments on a study of light-induced epilepsy in children. *American Journal of Diseases of Children*, 83, 409–410.
- Safran, A.B., Kline, L.B., Glaser, J.S., Daroff, R.B. (1981). Television-induced formed visual

hallucinations and cerebral diplopia. *British Journal of Ophthalmology*, 65, 707–711.

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## Telopsia

The term telopsia comes from the Greek words *tèle* (far) and *opsis* (seeing). It is used to denote a visual distortion in which stationary objects appear to be further away than they are. Telopsia is classified either as a \*metamorphopsia or as a \*dysmetropsia. The term is used in opposition to the term \*pelopsia. It should not be confused with the notions of \*micropsia and \*teleopsia.

### Reference

- Ey, H. (2004). *Traité des hallucinations. Tome 1*. Paris: Claude Tchou pour la Bibliothèque des Introuvables.

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## Temperature Illusion

see Thermal illusion.

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## Temperature Phonism

A term used to denote a type of \*synaesthesia characterized by a hallucinated sound (i.e. a \*phonism) which is triggered by a certain temperature or temperature change.

### Reference

- Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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## Temperature Photism

A term used to denote a type of \*synaesthesia characterized by a hallucinated colour sensation (i.e. a \*photism) which is triggered by a certain temperature or temperature change.

### Reference

- Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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## Temporal Anomaly

see Time distortion.

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## Temporal Arteritis and Hallucinations

Temporal arteritis is also known as giant cell arteritis (GCA). Both names are used to denote a vasculitis which affects (especially) the large and medium-sized arteries of the head. The name temporal arteritis refers to the temporal artery, the vessel most frequently involved. The name giant cell arteritis refers to the characteristic type of inflammatory cell involved in the vasculitic process, as seen on biopsy. Temporal arteritis may be complicated by various concomitant disorders, including visual loss (which is associated with ischaemia of any part of the visual system, ranging from the retina to the occipital cortex), and \*visual hallucinations. In a group of 31 individuals with temporal arteritis, the Israeli internists Gideon Neshet et al. found five subjects with a combination of permanent visual loss and \*visual hallucinations, and one with a combination of \*amaurosis fugax and visual hallucinations. Visual hallucinations occurring in the context of temporal arteritis tend to confine themselves to the areas of visual loss. As the combination of \*amaurosis and visual hallucinations is also seen in \*Charles Bonnet syndrome, it has been suggested that the mechanism underlying the hallucinations may be more or less the same. Special attention has been given to the mechanism of \*deafferentiation, which in the case of temporal arteritis has been attributed to posterior cerebral circulation ischaemia. The differential diagnosis of visual hallucinations concomitant with temporal arteritis should take into account the possibility of hallucinatory activity secondary to comorbid conditions such as \*delirium, infarcts affecting the primary sensory pathways or visual cortex, and \*steroid therapy. The role of steroids in these hallucinations would seem to be ambiguous. Although a well-known risk factor for the mediation of hallucinations, their application has been found to result in a prompt resolution of hallucinations in cases of temporal arteritis.

## References

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- Neshet, G., Neshet, R., Rozenman, Y., Sonnenblick, M. (2001). Visual hallucinations in giant cell arteritis: Association with visual loss. *Journal of Rheumatology*, 28, 2046–2048.
- Razavi, M., Jones, R.D., Manzel, K., Fattal, D., Rizzo, M. (2004). Steroid-responsive Charles Bonnet syndrome in temporal arteritis. *Journal of Neuropsychiatry and Clinical Neurosciences*, 16, 505–508.

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## Temporal Compression

The term temporal compression comes from the Latin words *tempus* (time), and *comprimere* (to compress, to press together). It was introduced in or shortly before 1999 by the American sociologist Michael G. Flaherty to denote a mnemonic phenomenon uniquely associated with one's experience of the past, in which temporal intervals (i.e. hours, days, months, years) seem to have passed quickly. The notion of temporal compression is used in opposition to the notions of \*protracted duration (characterized by the subjective feeling that time is passing slowly), and synchronicity (i.e. the normal experience of lived duration). It should not be confused with the \*quick-motion phenomenon, which refers to a \*time distortion associated with the present moment which is characterized by the sensation that psychological time has significantly speeded up, and that people and objects are rushing past at an extraordinary speed.

## References

- Flaherty, M.G., Meer, M.D. (1994). How time flies: Age, memory, and temporal compression. *Sociological Quarterly*, 35, 705–721.
- Flaherty, M.G. (1999). *A watched pot: How we experience time*. New York, NY: New York University Press.

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## Teresa de Cepeda y Ahumada

see Teresa of Ávila.

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### Teresa of Ávila (1515–1582)

Baptized as Teresa de Cepeda y Ahumada; also known as Saint Teresa of Jesus. A Spanish Carmelite nun and mystic who experienced \*ecstatic, \*trance-like states, \*out-of-body experiences, \*visions, and \*verbal auditory hallucinations which she designated as the voice of God. While retrospective diagnosis is always a delicate undertaking, it would seem to be especially so in the case of Teresa. During the 19<sup>th</sup> century her experiences were attributed mainly to \*hysteria, earning her the nickname ‘patron saint of hysterics’. However, her experiences have also been likened to certain stages of the LSD experience, and to \*ecstatic auras occurring in the context of temporal lobe epilepsy. The French psychiatrist Pierre Quercy, who devoted a 173-page analysis to Teresa’s experiences, contends that she suffered from \*oneiroid (i.e. dream-like) hallucinations of unknown cause.

#### References

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- Quercy, P. (1930). *L’hallucination. Tome 1. Philosophes. Mystiques*. Paris: Librairie Félix Alcan.
- St. Teresa of Ávila (1961). *The interior castle*. Translated by Peers, E.A. New York, NY: Image Books.

shortly before 1999 by the British neuroscientists Dominic H. ffytche and Robert J. Howard. It is used to denote a \*geometric hallucination consisting of repeated geometrical patterns featuring tiles, brickwork, triangles, hexagonal figures, grid-like patterns, latticed patterns, or network patterns. Phenomenologically, tessalopsia would seem to overlap with some of the \*form-constants of \*geometric hallucinations as described by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979). It is distinguished somewhat arbitrarily from \*dendropsia. Tessellopsia has been described as an \*aura occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy, in the context of \*Charles Bonnet syndrome, and after the use of \*hallucinogens such as LSD and mescaline. The notion of tessellopsia should not be confused with \*mosaic vision.

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### Tertiary Bow

see Rainbow.

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### Tessellated Hallucination

see Tessellopsia.

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### Tessellopsia

Also known as tessellated hallucination. Both terms are indebted to the Greek words *tessera* (a small tile used in mosaics), and *opsis* (seeing). The term tessellopsia was coined in or

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### Thalamic Experiential Hallucinosi

The term thalamic experiential hallucinosi is indebted to the medical Latin name thalamus, which in turn comes from the Greek word *thalamos* (sleeping room, inside room). It is used to denote a hallucinatory state associated with infarction of the thalamus. Hallucinations occurring in the context of thalamic experiential hallucinosi have been described as visual and auditory in nature. Conceptually, the condition may be seen as a variant of \*peduncular hallucinosi and \*brainstem auditory hallucinosi. As a nosological category, it is classified as a specific type of \*hallucinogenic syndrome.

#### Reference

- Noda, S., Mizoguchi, M., Yamamoto, A. (2003). Thalamic experiential hallucinosi. *Journal of*

*Neurology, Neurosurgery and Psychiatry*, 56, 1224–1226.

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## Thalamic Pain

see Central pain.

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## Therapeutic Hallucination

A term used in the literature on hypnotism to denote a \*hypnotically induced hallucination which may be utilized to uncover and explore unconscious or subconscious issues that can be employed in therapeutic interventions. As the Austrian-American psychiatrist and neurologist Leo Alexander (1905–1985) asserts, “Specific therapeutic hallucinations may be induced as a useful method to help the patient overcome phobic reactions to certain situations by working through the anxieties as they emerge during the hallucinatory re-vivification of the feared stressful situations.” Other purposes are served by the therapeutic hallucinations mentioned by Alexander, such as the fact that they are “vivid illustrations of the slow but unflinching positive nurturing and healing powers of nature” and “the patient’s hallucinatory or confabulatory substitution or addition of a suggestion which particularly fits his treatment needs”.

### Reference

Alexander, L. (1970). *Hypnotically induced hallucinations: Their diagnostic and therapeutic utilization*. In: *Origin and mechanisms of hallucinations. Proceedings of the 14<sup>th</sup> annual meeting of the Eastern Psychiatric Research Association held in New York City, November 14–15, 1969*. Edited by Keup, W. New York, NY: Plenum Press.

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## Therianthropy

see Clinical lycanthropy.

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## Thermal Hallucination

Also referred to as thermic hallucination. Both terms are used to denote a hallucination of temperature. Thermal hallucinations have been reported chiefly in the context of \*psychotic disorder and \*somatosensory aura. In both cases the phenomenon appears to be relatively rare, and seldom to occur in isolation.

### Reference

Mauguière, F. (1999). Scope and presumed mechanisms of hallucinations in partial epileptic seizures. *Epileptic Disorders*, 1, 81–91.

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## Thermal Illusion

Also known as temperature illusion. Both terms are used to denote a misperception or misinterpretation of temperature stimuli. Examples of thermal illusions are \*paradoxical cold and \*paradoxical heat.

### Reference

Long, R.R. (1977). Sensitivity of cutaneous cold fibers to noxious heat: Paradoxical cold discharge. *Journal of Neurophysiology*, 40, 489–502.

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## Thermic Hallucination

see Thermal hallucination.

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## Thornapple and Hallucinations

see Datura hallucination.

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## Thought Audition

see *Gedankenlautwerden*.

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## Thought Echoing

see *Gedankenlautwerden*.

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### Thought-Echo

see *Gedankenlautwerden*.

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### Thoughts-Out-loud

see *Gedankenlautwerden*.

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### Tilting Illusion

see Environmental tilt.

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### Time Distortion

Also known as illusory alteration of time, psychopathology of time judgment, paradoxical time sense, temporal anomaly, and dyschronation. All six terms are generic terms for a group of symptoms characterized by an altered experience of psychological time. In this context, psychological time is defined as the subjective estimation or experience of time. It is generally held that psychological time is constructed by the brain (and/or mind, in a dualist reading) on the basis of endogenous and exogenous stimuli, especially those which have a rhythmic character. Under physiological circumstances, psychological time may expand under the influence of boring events, and contract under the influence of interesting events. Although the notion of 'estimation' in the definition of psychological time would seem to hint at a cognitive phenomenon, time distortions tend to be conceptualized as perceptual phenomena. They may occur during altered states of consciousness (drug-induced or induced by physical exhaustion or stress), and in the context of \*psychotic disorder, \*aurae, and the \*Alice in Wonderland syndrome. When the experience of time is either speeded up or slowed down, the term \*tachypsychia applies. A variant of tachypsychia in which time is experienced as going too fast is called the \*quick-motion phenomenon. The opposite condition, in which time appears to pass extremely slowly, is called \*protracted duration. Time distortions may be accompanied by an altered sense of past and future, and by a subjective sensation

of a 'slowing down' of one's bodily motions (i.e. a \*slow-motion hallucination).

### References

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### Time-Grabbing Phenomenon

see Quick-motion phenomenon.

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### Tinel's Sign

see Tinel–Hoffmann sign.

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### Tinel's Symptom

see Tinel–Hoffmann sign.

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### Tinel–Hoffmann Sign

Also known as Tinel's sign, Tinel's sign of formation, Tinel's symptom, and Hoffmann–Tinel sign. The eponym Tinel–Hoffmann sign refers to the French neurologist Jules Tinel (1879–1952), and the German physiologist Paul Hoffmann (1884–1962), who both contributed to the description of the concomitant phenomenon in 1915. The Tinel–Hoffmann sign involves a tingling feeling (referred to as a \*paraesthesia or \*formication) that may be experienced in the cutaneous distribution of a damaged nerve when



the nerve is tapped lightly with a finger or tendon hammer. The presence of the Tinel–Hoffmann sign is considered prognostically favourable in compressed or regenerating peripheral nerves, as in the carpal tunnel syndrome, for example.

### References

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- Tinel, J. (1915). Le signe du fourmillement dans les lésions des nerfs périphériques. *La Presse Médicale*, 23, 388–389.

## Tinnitus

Also known as tinnitus aurium and syrigmus. The term tinnitus comes from the Latin verb *tinnire*, which means to ring. The person credited with its introduction is the Roman natural philosopher Gaius Plinius Secundus, better known as Pliny the Elder (AD 23–79). Tinnitus has been variously designated as ‘ringing in the ears’, ‘phantom sounds’, the perception of a sound in the absence of external auditory stimulation, and the perception of elementary non-environmental sounds or noise in the ear. Phenomenologically, it may present in the form of a variety of \*akoasms (i.e. \*nonverbal auditory hallucinations) such as ringing, hissing, a clear tone, a high-tension wire, buzzing, sizzling, whistling, humming, ticking, clicking, pounding, roaring, a pulsating sound, the sound of the wind or waves upon the shore, an ocean roar, and the chirping of crickets. When tinnitus is characterized by a single tone, it is referred to as \*tonal tinnitus. When characterized by a band of noise rather than a single tone, the term employed is \*noise-type tinnitus. Using the degree of coherence of binaural sounds as a guiding principle, tinnitus has been divided into \*coherent tinnitus (characterized by a single, centred, auditory percept), and \*incoherent tinnitus (characterized by two distinct stimuli). Sometimes tunes and songs are also identified as tinnitus (i.e. \*musical tinnitus), especially when they develop out of a more amorphous sound, such as ringing, buzzing or humming. Phenomenologically, musical tinnitus is indistinguishable from \*musical hallucinations. Tinnitus in general may be experienced either monaurally, binaurally, or as a sound perceived ‘inside the head’. The perceived noise

level may range from a quiet background noise to a signal that is loud enough to drown out all other sounds. The lifetime prevalence of tinnitus is estimated at between 10 and 15%, and that of severe, chronic tinnitus at between 2 and 5%. Using the scope of the perceived sound as a guiding principle, tinnitus has been divided into \*subjective and \*objective tinnitus. The term subjective tinnitus refers to a type of tinnitus which is experienced solely by the affected individual. The term objective tinnitus is reserved for cases in which a third person is also able to hear the sounds, either with the aid of a stethoscope, or as they emanate from the affected individual’s ear. An example of objective tinnitus is \*pulsatile tinnitus. Using the hypothetical locus of origin as a guiding principle, tinnitus has been divided into \*otic or \*peripheral tinnitus (associated with disorders of the inner ear and/or the acoustic nerve), \*central tinnitus (associated with conditions affecting the CNS), and \*somatic tinnitus (associated with peripheral conditions outside the ear). A different subdivision, also based on the condition’s hypothetical locus of origin, yields a division of tinnitus into \*conductive tinnitus, \*sensorineural tinnitus, and \*central tinnitus. Etiologically, tinnitus is associated with a broad range of conditions, including otitis media and externa, corpora aliena, impacted earwax, damage to the hair cells due to loud noises, conductive hearing loss, Ménière’s disease, acoustic neuromata, multiple sclerosis, head injury, thyroid disease, hyperlipidaemia, vitamin B12 deficiency, mercury or lead poisoning, and the prior use of ototoxic therapeutics. Over 300 types of medication list tinnitus as a possible side effect. The most obvious of these are chloroquine, quinine, the salicylates, the group of non-steroid anti-inflammatory drugs (NSAIDs), and certain members of such groups as \*antibiotics, chemotherapy drugs, and loop diuretics. The pathophysiology of tinnitus is largely unknown, as is its site of neural mediation. Contemporary conceptual models tend to emphasize that tinnitus may be mediated by any part of the auditory pathways, i.e. anywhere between the peripheral ear and the auditory cortex. As sustained tinnitus arises most frequently as a consequence of hearing loss, it has traditionally been assumed that hearing loss and tinnitus have a common etiology. While most cases of hearing loss are attributed to peripheral pathology, tinnitus has traditionally been attributed mainly to peripheral pathology. Today the role of central mechanisms is con-

sidered at least equally important, in the sense that abnormal auditory signals are deemed capable of influencing neural plasticity within central auditory structures. As a consequence, tinnitus tends to be conceptualized as a condition which is mediated and sustained by central neural networks, although it would often seem to be triggered by peripheral damage. To give expression to these conceptual considerations, the term \*acquired centralized tinnitus has been proposed.

### References

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### Tinnitus Aurium

see Tinnitus.

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### Toad Licking and Hallucinations

see Bufotenine and hallucinations.

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### Tobacco and Hallucinations

see Nicotine and hallucinations.

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### Toluene-Induced Hallucination

Toluene is also known as methylbenzene and phenylmethane. The name toluene refers to tolu balsam, an aromatic extract from the tropical tree *Myroxylon balsamum*. The name tolu balsam, in turn, is named after Santiago de Tolú, a town in Colombia. The introduction of the name toluene is attributed to the Swedish

father of modern chemistry Jöns Jakob Berzelius (1779–1848). It is used to denote an aromatic hydrocarbon that is widely used as a solvent in glue and other industrial products. It is also widely used as an inhalant drug for its hallucinogenic and other psychoactive properties, especially by schoolchildren, adolescents, and other individuals who cannot afford other drugs. Toluene is administered either through vapour inhalation (called sniffing, glue sniffing, or snorting) or by soaking a rag in a toluene-based substance such as glue and stuffing it in the oral cavity (huffing). The method where a plastic bag or bottle is used for the inhalation of toluene is called bagging. Once inhaled, 95% of the toluene is oxidized to become benzyl alcohol. The remaining 5% is oxidized to benzaldehyde and cresols. The mechanism involved in the mediation of toluene-induced hallucinations is basically unknown. After a state of intoxication is reached, toluene-induced \*sensory deceptions and distortions tend to linger on for about 30 min. The types of \*perceptual disturbances evoked by toluene inhalation include \*metamorphopsias (such as \*micropsia and \*macropsia), \*body schema illusions (such as \*whole body macrosomatognosia and \*whole body microsomatognosia), \*illusions, changes in the intensity of colour perception, and \*visual, \*auditory, \*somatic, \*tactile, \*kinaesthetic, and \*compound hallucinations. \*Gustatory hallucinations may also occur, albeit less frequently. Other psychoactive effects include euphoria, \*ecstasy, anxiety (mostly in response to frightening hallucinations), and \*time distortions. Toluene intoxication may entail mild or severe adverse effects, ranging from headaches to vertigo, \*tinnitus, dysarthria, confusion, abdominal pain, nausea, vomiting, anorexia, bronchospasm, cardiac arrhythmias, coma, and even death. Deaths associated with toluene intoxication are attributed primarily to fatal accidents and to cardiotoxicity. Fleeting illusions have also been reported as part of a withdrawal syndrome following the prolonged use of toluene. Other substances used as inhalant drugs include aerosols, airplane glue, butane gas, cleaning fluid, gasoline, kerosene, lighter fluid, rubber cement, and varnish remover.

### References

- Evans, A.C., Raistrick, D. (1987). Phenomenology of intoxication with toluene-based adhesives and butane gas. *British Journal of Psychiatry*, 150, 769–773.

Rudgley, R. (1998). *The encyclopaedia of psychoactive substances*. London: Little, Brown and Company.

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## Tonal Tinnitus

A term used to denote a type of \*tinnitus (i.e. ‘ringing in the ears’) characterized by a single tone. The term is used in opposition to the term \*noise-type tinnitus. Tonal tinnitus is considered less prevalent than noise-type tinnitus.

### Reference

Vernon, J.A., Sanders, B.T. (2001). *Tinnitus. Questions and answers*. Boston, MA: Allyn and Bacon.

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## Top Hat Illusion

Also known as Lincoln’s top hat illusion and Wundt–Fick illusion. All three terms refer to a size optical illusion or a \*geometric-optical illusion involving the top hat or stove pipe hat worn on certain photographs by US President Abraham Lincoln (1809–1865). While the hat appears to be tall, it is in fact just as wide as it is tall. The eponym Wundt–Fick illusion refers to the German father of psychology Wilhelm Wundt (1832–1920), and the German physiologist Adolph Fick (1829–1901), although it was Fick alone who described the concomitant illusion in his dissertation of 1851. The top hat illusion should not be confused with the \*hat illusion, which refers to a \*tactile hallucination or \*illusion reported in the context of sleep deprivation experiments.

### References

Fick, A. (1851). *Da errone quodam optic asymmetria bulbi effecto*. Marburg: Koch.  
 Ninio, J. (2001). *The science of illusions*. Translated by Philip, F. Ithaca, NY: Cornell University Press.

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## Topalgia

The term topalgia comes from the Greek words *topos* (spot, place) and *algos* (pain). It translates as ‘painful spot’. The term is used to denote a



**Fig. 1** Top hat illusion. Source: *La Nature*, 1890

painful spot or area that defies explanation in terms of a physiologic substratum. It tends to be used in the context of somatoform disorder, especially when the pain is located in a physiologically unlikely segment of the body. In the past, the occurrence of such painful spots was also referred to as ‘hysterical topalgia’. During the 1960s the notion of \*hallucinated pain was developed as a more or less synonymous concept.

### Reference

Mills, C.P. (1956). A “lump” in the throat. *Journal of Laryngology & Otology*, 70, 530–534.

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## Top–Down Attentional Factor

see Dissociation model of hallucinatory experience.

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## Top-Down Hypothesis

A generic name for hypotheses that attribute the mediation of hallucinations primarily to a disorder of the *conceptual* processing of perceptual information. Some examples of so-called top-down factors are prior knowledge, expectancy, attentional modulation, and \*imagery. The term top-down hypothesis is used in opposition to \*bottom-up hypothesis. The latter term refers to a group of hypotheses that attribute the mediation of hallucinations primarily to a disorder of the *data-driven* processing of perceptual information.

### Reference

Aleman, A., Larøi, F. (2008). *Hallucinations. The science of idiosyncratic perception*. New York, NY: American Psychological Association.

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## Top-Down Signal

see Reperception.

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## Topological Model of Hallucinatory Activity

The term topological model is indebted to the Greek words *topos* (place) and *logos* (word, teaching). It was introduced in or shortly before 2005 by the British neuroscientists Dominic H. ffytche and Marco Catani as a generic name for explanatory models that attribute the mediation of hallucinations primarily to a dysfunction of specific brain regions. Some examples of topological models of hallucinatory activity are the \*peduncular hallucinosis model, the \*brainstem auditory hallucinosis model, and the \*entoptic model. The term topological model is used in opposition to \*hodological model (which is a generic name for explanatory models that attribute the mediation of hallucinations primarily to the white-matter pathways between specific brain structures). The hodological and topological models are integrated in the so-called \*hodotopic model of hallucinatory activity.

### References

- ffytche, D.H., Catani, M. (2005). Beyond localization: From hodology to function. *Philosophical Transactions of the Royal Society of London Series B Biological Sciences*, 360, 767–779.
- ffytche, D.H. (2008). The hodology of hallucinations. *Cortex*, 44, 1067–1083.

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## Tortopia

The term tortopia comes from the Latin *tor-tum* (that which has been turned) and the Greek verb *opsis* (seeing). It translates loosely as ‘seeing things in a tilted position’. The term was proposed in 1983 by the American neurologist Allan H. Ropper to denote a symptom complex characterized by a tilting of the visual environment. At the core of this symptom complex lies the symptom \*environmental tilt. In a conceptual and phenomenological sense, tortopia is closely related to \*plagiopsia.

### Reference

- Ropper, A.H. (1983). Illusion of tilting of the visual environment. Report of five cases. *Journal of Clinical Neuro-ophthalmology*, 3, 147–151.

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## Total Anaesthesia

Also known as generalized anaesthesia and systematized anaesthesia. All three terms are indebted to the Greek noun *anaisthèsia*, which means numbness. They are used to denote a generalized loss or impairment of sensitivity to stimuli in the somatosensory modality, the adjective ‘generalized’ referring here to the whole body. Individuals with total anaesthesia are typically insensitive to painful stimuli (i.e. analgesic) but also to tactile, thermal, and other stimuli capable of affecting the somatosensory modality. Total anaesthesia is associated primarily with \*dissociative states following extreme stress, suggestion or hypnosis. It has also been described in association with \*ecstasy, \*trance, rapture, somnambulism, conversion, and \*psychosis. Because

of the apparent failure to register any external stimuli affecting the somatosensory modality, total anaesthesia has been designated as a type of \*negative hallucination (i.e. a failure to perceive an object or stimulus actually present within one's range of perception). The term total anaesthesia is used in opposition to the term localized anaesthesia. It should not be confused with \*acenesesthesia, which is characterized by a total loss of awareness of physical existence. Neither should it be confused with Cotard's syndrome, which is characterized by the delusional conviction (rather than the perceptual experience) that one's body has ceased to exist.

#### References

- Braude, S.E. (2004). *Memory: The nature and significance of dissociation*. In: *The philosophy of psychiatry. A companion*. Edited by Radden, J. Oxford: Oxford University Press.
- Janet, P. (1911). *L'état mental des hystériques*. Deuxième édition. Paris: Félix Alcan.

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### Total Body Macrosomatognosia

see Whole body macrosomatognosia.

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### Total Body Microsomatognosia

see Whole body microsomatognosia.

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### Total Colour Blindness

see Achromatopsia.

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### Total Hallucination

A term used in thanatology to denote a type of \*deathbed vision in which the whole sensory environment is replaced by hallucinatory images, much like \*scenic or panoramic hallucinations. The parapsychologists Karlis Osis (1917–1997) and Erlendur Haraldsson (b. 1931) use the term total hallucination in cases where the dying individual "is either no longer aware of his surroundings or else speaks as if he were in two worlds

at once." When total hallucinations are accompanied by a compelling sense of objectivity, they are said to have a high degree of \*xenopathy.

#### Reference

- Osis, K., Haraldsson, E. (1977). *At the hour of death*. New York, NY: Avon Books.

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### Touch Hallucination

see Tactile hallucination.

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### Touch Phonism

A term used to denote a type of \*synaesthesia characterized by a hallucinated sound (i.e. a \*phonism) which is triggered by a regular tactile percept.

#### Reference

- Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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### Touch Photism

A term used to denote a type of \*synaesthesia characterized by a hallucinated colour sensation (i.e. a \*photism) which is triggered by a regular tactile percept.

#### Reference

- Cytowic, R.E. (2002). *Synesthesia. A union of the senses. Second edition*. Cambridge, MA: MIT Press.

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### Toxic-Metabolic Encephalopathy

see Delirium.

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### Tracers

see Trailing phenomenon.

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## Trailing Phenomenon

Also known as trailing effect and tracers. The first two terms were introduced in or shortly before 1971 by the American psychiatrist and addiction specialist Harvey Asher to denote a visual phenomenon which is associated with the (prior) use of \*hallucinogens such as LSD, and which is characterized by a series of discontinuous stationary images that trail behind a moving object or stimulus. As Asher asserts, “‘Trailing effect’ is the term used to describe seeing a moving object not as an individual entity in motion but in serial, momentarily stationary positions. If the observer moves his finger across his field of vision, he not only sees his finger moving as a single object, but also sees the various individual movements needed to make up the complete movement. It is like a slow-motion multiple exposure effect. Although this is first seen while the person is under the acute



**Fig. 2** Trailing phenomenon. Source: Mavromatis, A. (1987). *Hypnagogia. The unique state of consciousness between wakefulness and sleep*. London: Routledge. Reproduced with permission

influence of the drug, some LSD users report that it remains with them for up to one year after drug ingestion.” In addition to their occurrence during the acute stages of intoxication with hallucinogens such as LSD, and during \*flashback episodes, the trailing phenomenon has also been reported in the context of \*hallucinogen-induced persistent perception disorder (HPPD). Conceptually as well as phenomenologically, the trailing phenomenon may be considered a variant of \*visual perseveration, which is itself classified as a \*reduplicative phenomenon or a type of \*metamorphopsia.

## Reference

Asher, H. (1971). “Trailing” phenomena – A long-lasting LSD side effect. *American Journal of Psychiatry*, 127, 1233–1234.

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## Trait Hallucinator

Also referred to as trait-positive hallucinator. Both terms are used to denote an individual with a history of hallucinatory experience who is not currently hallucinating. They are used in opposition to \*trait-negative hallucinator, and non-\*hallucinator (which are both used to denote an individual without a history of hallucinatory activity), as well as to \*hallucinator, a term used to denote an individual who is currently hallucinating.

## Reference

Woodruff, P.W., Wright, I.C., Bullmore, E.T., Brammer, M., Howard, R.J., Williams, S.C., Shapleske, J., Rossell, S., David, A.S., McGuire, P.K., Murray, R.M. (1997). Hallucinations and the temporal cortical response to speech in schizophrenia: A functional magnetic resonance imaging study. *American Journal of Psychiatry*, 154, 1676–1682.

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## Trait-Negative Hallucinator

Also referred to as non-hallucinator. Both terms are used to denote an individual without a history of hallucinatory experience. They are used in opposition to \*trait hallucinator, and \*trait-positive hallucinatory (which are both used to denote an individual with a history of hal-

lucinatory activity who is currently not hallucinating), as well as to \*hallucinator, a term used to denote an individual who is currently hallucinating.

#### Reference

Woodruff, P.W., Wright, I.C., Bullmore, E.T., Brammer, M., Howard, R.J., Williams, S.C., Shapleske, J., Rossell, S., David, A.S., McGuire, P.K., Murray, R.M. (1997). Hallucinations and the temporal cortical response to speech in schizophrenia: A functional magnetic resonance imaging study. *American Journal of Psychiatry*, 154, 1676–1682.

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### Trait-Positive Hallucinator

see Trait hallucinator.

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### Trance and Hallucinations

The term trance comes from the Latin noun *transitus*, which means passage. It is used as a generic term for various states of altered consciousness, notably those characterized by a markedly narrowed consciousness. Trance states are often accompanied by a diminished responsiveness to sensory stimuli. Conceptually, they are related to other states of altered consciousness such as rapture, \*ecstasy, \*dissociation, hypnotic states, and somnambulism. It is as yet debatable whether these notions represent distinct types of consciousness, or merely reflect differences in conceptual approach to a single type of consciousness. In a phenomenological sense, at least, the states listed above display a considerable overlap. In anthropology and cross-cultural psychiatry, a distinction is made between a trance interpreted as spirit possession (i.e. a possession trance), and a trance not interpreted as spirit possession (simply referred to as a trance). Moreover, trance states can be either self-induced or induced by others, as in hypnotism. The hypnotic trance state is traditionally divided into three stages, comprising (1) light trance (during which the subject is lethargic, but aware of his or her surroundings), (2) medium trance (characterized by muscular rigidity), and (3) deep trance (during which the subject tends to be the most compliant to the hypnotist's suggestions). It is during the lat-

ter stage, in particular, that \*illusions and hallucinations can be induced, the most prevalent type being the \*scenic or panoramic hallucination. A person intentionally employing trance states for the purpose of exploring the psyche may be called a \*psychonaut.

#### Reference

Goodman, F.D., Henney, J.H., Pressel, E. (1982). *Trance, healing, and hallucination. Three field studies in religious experience*. Malabar, FL: Robert E. Krieger Publishing Company.

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### Transduction Tinnitus

A term used to denote a subtype of \*sensorineural tinnitus attributable to damage to the ear's inner hair cells. The term transduction tinnitus is used in opposition to \*motor tinnitus, \*transformation tinnitus, and \*objective tinnitus.

#### Reference

Henry, J.A., Dennis, K.C., Schechter, M.A. (2005). General review of tinnitus. Prevalence, mechanisms, effects, and management. *Journal of Speech, Language, and Hearing Research*, 48, 1204–1235.

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### Transformation Tinnitus

A term used to denote a subtype of \*sensorineural tinnitus attributable to damage to the acoustic nerve. The term transformation tinnitus is used in opposition to \*motor tinnitus, \*transduction tinnitus, and \*objective tinnitus.

#### Reference

Henry, J.A., Dennis, K.C., Schechter, M.A. (2005). General review of tinnitus. Prevalence, mechanisms, effects, and management. *Journal of Speech, Language, and Hearing Research*, 48, 1204–1235.

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### Transposition of the Senses

A term used during the era of mesmerism to denote a \*synaesthesia or \*extracampine hallucination which is interpreted as an instance of

veridical perception by means of other than the usual sense organs. This extraordinary mode of perceiving was first conceptualized and described in 1785 by a French army captain named Jean-François Tardy de Montravel, who claimed that during a half-waking trance he was able to see “with the pit of his stomach” (i.e. the *plexus solaris*). In 1808 the French physician Jacques Pététin (1744–1808) published an entire collection of such cases, including one in which taste, smell, and hearing were found to wander from the stomach to the fingertips and the toes. Later, many other descriptions of this type were published, most of them in association with somnambulism or hysteria.

#### Reference

Lombroso, C. (1922). *Hypnotisme et spiritisme*. Traduit par Rossigneux, Ch. Paris: Ernest Flammarion, Éditeur.

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### Traumatic Nightmare

Also known as post-traumatic nightmare. Both terms are used to denote a type of \*nightmare characterized by a long, frightening \*dream during which a traumatic event is re-experienced exactly as it actually happened. Traumatic nightmares tend to occur during REM sleep, but they have occasionally been reported during stage N2 sleep as well (i.e. a light sleep, characterized on the electroencephalogram (EEG) by sleep spindles and K complexes). Although a certain phenomenological parallel exists between traumatic nightmares and \*reperceptive hallucinations, traumatic nightmares are traditionally set apart from the group of \*hallucinations proper because they occur during sleep.

#### Reference

Hartmann, E. (1984). *The nightmare. The psychology and biology of terrifying dreams*. New York, NY: Basic Books.

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### Travelling Clairvoyance

see Remote viewing.

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### Trip

see LSD trip.

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### Tritan Colour Blindness

see Tritanopia.

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### Tritan Colour Deficiency

see Tritanopia.

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### Tritanomaly

The term tritanomaly comes from the Greek words *treis* (three) and *anōmalia* (anomaly, irregularity). It translates roughly as ‘an irregularity in the ability to perceive the third of the primary colours’ (i.e. blue). The term is used to denote a relatively rare type of \*colour vision deficiency in which the ability to discriminate between blue and green, and between yellow and violet, is diminished but not absent. Pathophysiologically, tritanomaly is associated with a diminished sensitivity of the blue receptor mechanism. It is classified as an \*anomalous trichromatism, which itself constitutes one of the colour vision deficiencies. The term tritanomaly is used in opposition to the terms \*protanomaly, and \*deutanomaly.

#### References

Hsia, Y., Graham, C.H. (1965). *Color blindness*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: Wiley.  
 McIntyre, D. (2002). *Colour blindness. Causes and effects*. Chester, PA: Dalton Publishing.

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### Tritanopia

Also known as blue–yellow colour blindness, tritan colour blindness, and tritan colour deficiency. The term tritanopia comes from the Greek words *treis* (three), *an* (not), and *opsis* (seeing). It translates roughly as ‘not being able to see



the third of the primary colours' (i.e. blue). It is used to denote a type of \*colour vision deficiency characterized by an inability to discriminate between blue and green, and between yellow and violet. Tritanopia is a rare condition, whose lifetime prevalence is estimated at around 1:10,000. Etiologically, it is attributed to an autosomal disorder linked to chromosome 7. As a consequence, the condition affects males and females in equal measure. Due to this chromosomal anomaly, the short-wavelength cones (or S-cones) in the retina are missing. As a consequence, the resulting colour vision deficiency is absolute. When the S-cones are present but malfunctioning, the colour vision deficiency may be relative rather than absolute. It is then referred to as \*tritanomaly. Tritanopia is classified as a \*dichromatism, which itself constitutes one of the colour vision deficiencies. The term tritanopia is used in opposition to the terms \*protanopia and \*deutanopia.

#### References

- Hsia, Y., Graham, C.H. (1965). *Color blindness*. In: *Vision and visual perception*. Edited by Graham, C.H. New York, NY: Wiley.
- McIntyre, D. (2002). *Colour blindness. Causes and effects*. Chester, PA: Dalton Publishing.

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### Tritone Paradox

see Musical illusion.

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### True Hallucination

The term true hallucination has a variety of meanings and connotations. First, it is used to remove any possible doubt concerning the status of a given percept as a hallucination. In this context, the term is used by the French psychiatrist Claude-François Michéa (1815–1882) in opposition to the term \*false hallucination (which may refer to a \*dream or \*incomplete hallucination, for example). True hallucinations are also referred to as \*genuine hallucinations, \*veridical hallucinations, and \*hallucinations proper. Second, the term true hallucination has sometimes been used in a seemingly paradoxical sense. For example, the French critic and historian Hippolyte Taine (1828–1893) employs the term to denote a regular sense perception. Starting from

the premise that sense perceptions are based on mind-independent objects or stimuli in the external environment, whereas hallucinations derive their contents from endogenously generated perceptual information, Taine argues that “instead of saying that an hallucination is a false exterior percept, one should say that the external percept is a true hallucination.” A third meaning of the term true hallucinations stems from parapsychology, where it is sometimes used as a synonym for \*veridical hallucination and \*coincidental hallucination. Although the exact meaning of these latter terms tends to vary somewhat from author to author, they all refer to percepts that have a bearing on actual people (or objects, or situations) from which the \*hallucinator is separated in place and/or time. Despite the use of the adjective ‘true’, for some parapsychologists there is still a certain connotation of subjectivity or morbidity connected with the word hallucination. In an attempt to do away with that connotation, it has been proposed to replace the term true hallucination with the term \*monition.

#### References

- Michéa, C.-F. (1871). *Du délire des sensations*. Paris Labé.
- Myers, F.W.H. (1903). *Human personality and its survival of bodily death. Volume I*. London: Longmans, Green, and Co.
- Taine, H. (1870). *De l'intelligence. Tome 2*. Paris: Librairie Hachette et Cie.

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### True Hallucinogen

see Deliriant.

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### True Negative Hallucination

A term used by the German hallucinations researcher Edmund Parish (1861–1916) to denote a \*negative hallucination (characterized by the inability to perceive an object or stimulus within one's range of perception) that does not occur because the subject's attention has been diverted, but because of suggestion: for example, the suggestion that the glass upon which the subject is asked to concentrate will disappear when the hypnotist produces a clicking sound. To Parish,

the adjective ‘true’ serves to point out the actual nature of the phenomenon.

### Reference

Parish, E. (1897). *Hallucinations and illusions. A study of the fallacies of perception*. London: Walter Scott.

## Tullio Phenomenon

The eponym Tullio phenomenon refers to the Italian physiologist Pietro Tullio (1881–1941), who is credited with having been the first to describe the physiological correlate of a rare syndrome in which vestibular signs and symptoms are provoked by auditory stimulation. These signs and symptoms may present in the form of vertigo, postural imbalance, \*oscillopsia, nystagmus, ocular tilt or any other vestibular symptom during exposure to auditory stimuli of a high intensity. Such auditory stimuli may stem from music or other loud environmental sounds, but also from one’s own voice. The Tullio phenomenon has generally been described as a comorbid condition in Ménière’s disease. Pathophysiologically, it is associated with an abnormally low threshold for click-evoked vestibulocollic responses, as well as with dehiscence of the roof of the anterior (superior) semicircular canal. Etiologically, it is associated primarily with perilymph fistulae, traumata, infectious disease (such as Lyme disease and syphilis), neoplasms (such as osteomata), and vestibulofibrosis. A congenital variant has also been described. Conceptually, the Tullio phenomenon bears a certain similarity to phenomena such as \*synaesthesia, the \*reflex hallucination, the \*creative hallucination, the \*functional hallucination, and the Proust phenomenon (involving odours which evoke autobiographical memories, named after the French author Marcel Proust (1871–1922)). In all these examples, \*cross-activation can be conceived as a possible neurophysiological substrate.

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Structural and functional assessment. *Neurology*, 54, 722.

## Tunnel

Also referred to as funnel, alley, cone, and vessel. All five terms were introduced in or shortly before 1928 as more or less synonymous terms by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to denote one of the four \*form-constants of \*geometric visual hallucinations which may occur during the initial stages of mescaline intoxication. Klüver uses the term form-constant to denote certain visual forms and elements that “appear in almost all mescal visions”. According to him, “many ‘atypical’ visions are upon close inspection nothing but variations of these form-constants.” The examples of the tunnel or funnel shape given by Klüver, based on the observations of different test persons, are rendered by him as follows. “‘Sometimes I seemed to be gazing into a vast hollow revolving vessel, on whose polished concave mother-of-pearl surface the hues were swiftly changing’; ‘the field of vision is similar to the interior of a cone the vertex of which is lying in the center of the field directly before the eyes (or vice versa)’; ‘vision of a tunnel in copper-brown color... lines seem to converge in the infinite’; ‘a large black corridor seen in extremely deep perspective’; ‘upon pressure on

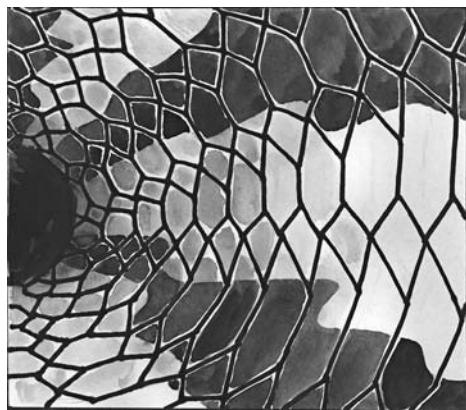


Fig. 3 Tunnel with tessellation. Illustration by JDB

the closed eyes I saw first an alley in very deep perspective'; 'deep beautiful perspectives. . . growing into the infinite. . .'; 'in deep perspective a suite of oriental rooms'; 'extending away from me a long narrow corridor. . . often looking into cupolas which widen more and more. . . the cupola became increasingly deeper, more funnel-shaped, narrower'; 'I was standing in a very long and wide tunnel'; 'long narrow funnels. . . the ends of which appear in the distance as brilliant points. . . their walls and the perspective effects are in most cases formed by small parallel lines. . .'; 'a large cylindrical hall'; 'the designs occupied the wall of a colossal cone'; 'the pyramid changes into a luminous cone'. Klüver names the three remaining form-constants \*chessboard design, \*cobweb figure, and \*spiral. In parapsychology, seeing a tunnel shape is sometimes interpreted as a sign of the individual's passage to another plane of existence. According to the American parapsychologist Raymond A. Moody, Jr. (b. 1944), for example, seeing a tunnel is a common feature of \*near-death experiences (NDEs).

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### TV Sign

A term used to denote a subclass of the \*misidentification syndrome in which the events on television are perceived as occurring in external, three-dimensional space. The TV sign is a relatively common \*cognitive illusion occurring in the context of senile dementia, especially when complicated by \*visual hallucinations or \*illusions. The affected individual may be under the mistaken impression that a person appearing on TV is actually present in his or her home. This may lead to behavioural reactions such as a refusal to undress while people on TV may be 'watching', fearful reactions to violent scenes, and attempts to interact with persons seen on TV. Etiologically, the TV sign is not necessarily associated with Alzheimer's disease or any other type of dementia. Two related misidentification syndromes are the \*magazine sign, and the \*picture

sign. The TV sign should not be confused with the \*television-induced hallucination.



Fig. 4 TV sign. Illustration by JDB

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### Twilight State and Hallucinations

The term twilight state is used to denote a prolonged state of clouded or narrowed consciousness during which the affected individual is virtually unaware of his or her environment, and typically experiences \*visual and/or \*auditory hallucinations. These hallucinations may also be \*compound or \*panoramic in nature, in the latter case replacing the entire extracorporeal environment as perceived through the senses. Twilight states tend to be accompanied by irrational motor behaviour such as undressing in public, aimless wandering, running away, or committing acts of violence. They can last for a period of days to weeks, although twilight states lasting up to a year have been described as well. They

tend to begin and end abruptly, and to be followed by amnesia for the entire episode, and/or a subjective sense of having been dreaming. When the clinical picture is dominated by hallucinations and \*illusions, the term \*hallucinatory twilight state is used. Using the supposed etiology of the syndrome as a guiding principle, twilight states are traditionally divided into organic and psychogenic twilight states. Some examples of organic twilight states are those occurring in the context of complex partial seizures affecting the temporal lobe (i.e. epileptic or episodic twilight states), fever, uraemia, eclampsia, and intoxication with alcohol (i.e. alcoholic twilight states) or other substances. Some examples of psychogenic twilight states are those occurring in the context of \*dissociation (i.e. dissociative or hysterical twilight states), the Ganser syndrome or mood disorders. Within the context of this dichotomous classification, the status of twilight states occurring in association with catatonia would seem to be open to debate. In 1926 the German neuropsychiatrist Karl Kleist (1879–1960) devised an elaborate classification of twilight states. An extreme variant of the twilight state occurring in Haiti, and described in 1985 by the Canadian anthropologist and ethnobotanist Edmund Wade Davis (b. 1953), is called zombification. Reportedly, this type of twilight state can be evoked with the aid of a potion containing tetrodotoxin or alkaloids such as datura. Conceptually as well as phenomenologically, the twilight state would seem to lie on a continuum with conditions such as dissociation, hysteria, fugue, \*hallucinatory epilepsy, postictal confusion, \*alcoholic hallucinosis, and \*delirium.

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## Tympanophonia

The term tympanophonia comes from the Greek words *tumpanon* (kettledrum) and *phōnè* (sound, voice). It translates loosely as 'eardrum sound'. Tympanophonia is also known as autophonia, although the latter term is more properly used to emphasize a different aspect of certain otological conditions. The Graeco-German neologism *Autophonie* was coined in or shortly before 1868 by the Viennese otologist Josef Gruber (1827–1900) to denote the hyperperception of one's own voice that may accompany disorders of the ear. Gruber introduced the term *Tympanophonie* to denote the objective amplification of the voice's volume – as recorded by means of auditory auscultation – in disorders of the ear. Today the two terms are used interchangeably, and their definition has been expanded to include the increased hearing of one's own voice, breath sounds, arterial murmurs, and other noises of the upper body that may occur in diseases of the middle ear and nasal fossae, and after rapid weight loss.

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# U

## Ulloa Circle

Also known as circle of Ulloa, Ulloa ring, Ulloa's ring, Ulloa's halo, Bouguer's halo, white rainbow, and fogbow. The eponym Ulloa circle refers to the Spanish naval officer, explorer, and astronomer Antonio de Ulloa y de Torre-Giral (1716–1795). It is used in meteorology to denote a rare \*physical illusion consisting of a white luminous ring or arch that can sometimes be seen in mountainous regions, typically in foggy weather, while facing an area opposite the Sun (i.e. the antisolar point). Inside the Ulloa ring smaller rings or arches can sometimes be seen. These are known as glories or \*Ulloa's bows. Ulloa is commonly credited with having been the first to record both phenomena, after having observed them during an expedition in what is now Ecuador, between 1735 and 1739. As recounted by the French astronomer and author Nicolas Camille Flammarion (1842–1925), “Ulloa, being in company with six fellow-travellers upon the Pambamarca at daybreak one morning, observed that the summit of the mountain was entirely covered with thick clouds, and that the Sun, when it rose, dissipated them, leaving only in their stead light vapours, which [were] almost impossible to distinguish. Suddenly, in the opposite direction to where the Sun was rising, ‘each of the travellers beheld, at about 70 feet from where he was standing, his own image reflected in the air as in a mirror. The image was in the centre of three rainbows of different colours, and surrounded at a certain

distance by a fourth bow with only one colour. The inside colour of each bow was carnation or red, the next shade was violet, the third yellow, the fourth straw colour, the last green. All these bows were perpendicular to the horizon; they moved in the direction of, and followed, the image of the person whom they enveloped as with a glory.’ The most remarkable point was that, although the seven spectators were standing in a group, each person only saw the phenomenon in regard to his own person, and was disposed to believe that it was repeated in respect to his companions.” The mediation of the Ulloa circle is not fully understood. A central role is attributed to the interaction of sunlight and droplets of water less than 10  $\mu\text{m}$  in radius suspended in the air. Flammarion classifies the Ulloa circle as an \*anethelion. Today both atmospheric phenomena are generally classified as physical illusions. Because of its lack of a tangible substratum in the extracorporeal world, the Ulloa circle is also classified as a \*fiction illusion. A physical illusion quite similar to the Ulloa circle is known as Buddha's light or \*Buddha's halo. It should not be confused with \*heiligschein.

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**Fig. 1** Ulloa circle. Source: Flammarion, C. (1873). *The atmosphere*. Translated by Pitman, C.B. Edited by Glaisher, J. London: Sampson Low, Marston, Low, & Searle

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## Ulloa Ring

see Ulloa circle.

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## Ulloa's Bow

Also known as glory. The eponym Ulloa's bow refers to the Spanish naval officer, explorer, and astronomer Antonio de Ulloa y de Torre-Giral (1716–1795). It is used in meteorology to denote a \*physical illusion consisting of one or more

colourful rings or arches, which have their colours arranged in the reverse order of those in a \*rainbow. Sometimes these colourful rings or arches can be seen within a white luminous ring or arch called an \*Ulloa circle. Both phenomena are sometimes seen in mountainous regions, typically in foggy weather, while facing a direction opposite the Sun (i.e. the antisolar point). In the past this used to be a rare experience worthy of publication. However, today Ulloa's bow is a common phenomenon seen by airline travellers looking down upon clouds opposite the Sun. Ulloa is commonly credited with having been the first to record Ulloa's bow and the Ulloa circle, after having observed them during an expedition in what is now Ecuador, between 1735 and 1739. Although the mediation of Ulloa's bow is not fully understood, a central part is attributed to the interaction of sunlight and droplets of water less than 25  $\mu\text{m}$  in radius suspended in the air. When Ulloa's bow is accompanied by a \*Brocken

spectre, the term \*Brocken bow is used. Because of its lack of a tangible substratum in the extracorporeal world, Ulloa's bow is also classified as a \*fiction illusion.

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### Ulloa's Halo

see Ulloa circle.

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### Unformed Hallucination

Also known as unformed visual hallucination and unformed vision. All three terms are used to denote a visual hallucination depicting an amorphous shape or image. The term unformed hallucination derives from a classification of hallucinations that uses phenomenological form as a guiding principle. It is used in opposition to the term \*formed hallucination. Although it is traditionally used with regard to the visual modality, the term unformed hallucination also applies to an auditory hallucination consisting of static noise (i.e. \*tinnitus).

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### Unformed Vision

see Unformed hallucination.

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### Unformed Visual Hallucination

see Unformed hallucination.

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### Unilateral Auditory Hallucination

Also known as \*unilateral hallucination. Both terms are indebted to the Latin words *unus* (one) and *latus* (side). They are used to denote an auditory hallucination perceived on one side of the head. Pathophysiologically, unilateral auditory hallucinations are associated with ipsilateral ear lesions (such as otosclerosis or acoustic neuroma) or contralateral brain lesions (more specifically, lesions affecting the contralateral temporal lobe or hippocampus). In clinical practice, however, it is not always possible to demonstrate the presence of such pathological conditions. Unilateral auditory hallucinations due to an ear condition are also referred to as \*unilateral otopathic auditory hallucinations. The German psychiatrist Friedrich Jolly (1844–1904) has been credited with being the first to reproduce unilateral auditory hallucinations experimentally by means of electrical stimulation of the acoustic nerve. The term unilateral auditory hallucination is used in opposition to the term \*bilateral auditory hallucination.

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### Unilateral Hallucination

The term unilateral hallucination is indebted to the Latin words *unus* (one) and *latus* (side). It is used to denote a type of hallucination experienced on one side of the body. The term applies

to \*auditory, \*visual, and \*tactile hallucinations, but in the literature it is mostly used as a synonym for \*unilateral auditory hallucination.

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### Unilateral Otopathic Auditory Hallucination

A term used to denote a \*unilateral auditory hallucination attributable to an ipsilateral ear lesion.

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### Unimodal Hallucination

The term unimodal hallucination is indebted to the Latin words *unus* (one) and *modus* (means, manner). It is used to denote a hallucination that confines itself to a single sensory modality. Unimodal hallucinations can be either \*elementary, \*geometric, or \*complex in nature. Alternatively, they can be divided into \*formed and \*unformed hallucinations. The term

unimodal hallucination is used in opposition to \*multimodal hallucination.

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### Unstructured Photopsia

Also known as \*phosphene. Both terms are used to denote a type of \*photopsia (i.e. a ‘flash of light’) consisting of an unformed shape. The term unstructured photopsia is used in opposition to \*structured photopsia. Pathophysiologically, the mediation of unstructured photopsia has historically been associated primarily with aberrant neurophysiological activity in the retina and other peripheral parts of the visual system, although theoretically any part of the visual system may be involved in their mediation.

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### Upside-Down Reversal of Seeing

see Environmental tilt.



# V

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## VAH

see Verbal auditory hallucination.

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## Valium and Hallucinations

see Benzodiazepine-induced hallucination.

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## Van Gogh, Vincent Willem (1853–1890)

A Dutch post-impressionist painter who suffered from severe headaches, \*nightmares, epileptic seizures, \*tinnitus, hallucinations, and other \*perceptual disturbances, who cut off his left ear lobe, and who shot himself in 1890. The hallucinations van Gogh experienced included \*verbal and \*nonverbal auditory hallucinations, \*musical hallucinations, and \*visual hallucinations. The etiology of these phenomena has been heavily debated. In the literature no less than 30 different diagnoses have been suggested, including \*schizophrenia, neurosyphilis, bipolar disorder, borderline personality disorder, temporal lobe epilepsy, alcoholism, \*absinthism, tuberculous meningoencephalitis, acute intermittent porphyria, Ménière's disease, brain tumour, and sunstroke. The use of brilliant yellow tones in van Gogh's paintings has been interpreted as a reac-

tion to episodic \*xanthopsia (i.e. yellow vision), possibly caused by digitalis intoxication. The halos surrounding the stars in the painting *The Starry Night* have been interpreted as an indication that van Gogh may have experienced \*halo vision.

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## Verbal Auditory Hallucination (VAH)

Also known as auditory verbal hallucination, voice hallucination, \*phoneme, hallucinated speech, and 'voices'. All five terms are used to denote a subclass of the group of \*auditory hallucinations, the content of which is verbal in nature. The expressions verbal auditory hallucination (VAH) and auditory verbal hallucination (AVH) refer to the same phenomenon, and in most cases they may be used interchangeably. And yet the two terms have a slightly different connotation, due to the different conceptual backgrounds from which they stem. By definition, VAHs are primarily auditory in nature. They are distinguished from other auditory hallu-

inations (i.e. \*musical hallucinations, \*nonverbal auditory hallucinations) by means of the adjective *verbal*. The notion of the AVH, on the other hand, refers to a type of hallucination that is primarily verbal in nature and is distinguished from other verbal hallucinations (such as \*psychomotor verbal hallucinations and \*visual verbal hallucinations) by means of the adjective auditory. Phenomenologically, VAHs consist of one or more voices which are experienced as coming from within the head (i.e. \*internal auditory hallucinations) or from outside the head (i.e. \*external auditory hallucinations). In some cases the difference may be unclear, and in other cases voices may swap their perceived location. VAHs may be benign or malignant in nature, in the sense that they may give valuable advice or make pleasant comments, or they may insult or threaten the affected individual. When they consist of spoken orders or incentives, they are referred to as command hallucinations or \*imperative hallucinations. They may also give a running commentary on the individual's thoughts or behaviour. They may speak in a regular tone of voice, whisper or shout, and they may be intelligible or unintelligible. When voices are unintelligible, this may be because they are muffled, faint or far-off, because they speak in a foreign language, or because they are masked by other voices or nonverbal sounds. In clinical practice the assertion that voices are unintelligible is not seldom a euphemism for their impudent content, which is often of a sexual or aggressive nature. Regarding their pathophysiology, VAHs are associated with aberrant neurophysiological activity in the left temporal lobe, more specifically, the gyrus temporalis superior, Heschl's gyrus, the planum temporale, and the speech areas (i.e. Broca's area and Wernicke's area). However, findings from functional imaging studies suggest that the right homologue of Broca's area may also be involved in the mediation of VAHs. Parallel to the work of such scientists as the American psychologist Julian Jaynes (1920–1997) and the British psychiatrist Timothy Crow, it has been hypothesized that this may be a sign of incomplete lateralization of language functions in the brain. Moreover, it has been hypothesized that cortical hallucinatory activity may be preceded by subcortical activity, notably in the limbic system and amygdala. Theoretically, this would make sense if the hallucinations are interpreted as \*reperceptions of priorly memorized speech. When voices are attributable to the top of the brainstem and/or its surrounding mid-

brain structures, the term \*brainstem auditory hallucinosis is used. For further details on VAHs see the entries Auditory hallucination, Auditory illusion, Auditory pareidolia, Auditory verbal hallucination, *Gedankenlautwerden*, Subvocalization, and Verbal hallucination.

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## Verbal Hallucination

Also known as \*phonemic hallucination. The origin of the term verbal hallucination is unknown, but it was used by classic authors such as the French psychiatrist Louis Jules Ernest Séglas (1856–1939) and the German neurologist and psychiatrist Kurt Goldstein (1878–1965) to denote a hallucination conveying words, either in an audible form (as in the \*verbal auditory hallucination), an inaudible form (as in the \*psychomotor verbal hallucination), an actual spoken form (i.e. the \*motor hallucination), or a written form (i.e. the \*visual verbal hallucination). Goldstein conceptualizes speech as consisting of an auditory component and a motor component, which may be activated either simultaneously or separately. Today the term verbal hallucination is used sometimes in a rather loose sense as an equivalent for the term verbal auditory hallucination. It features prominently in the 1974 Present State Examination (PSE) schedule. The PSE lists as subclasses of the verbal hallucination the \*affective (or non-specific)

verbal hallucination, and the \*non-affective verbal hallucination. The term verbal hallucination is used in opposition to the term \*nonverbal hallucination.

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### Verbal Impulse

The French term *impulsion verbale* was introduced in or shortly before 1888 by the French psychiatrist Louis Jules Ernest Séglas (1856–1939) to denote a type of \*psychic hallucination. Under the heading of verbal impulses Séglas subsumed such phenomena as onomatomania (i.e. the obsessive utterance of words), coprolalia (i.e. the impulsive production of foul language), and *médiumnité parlante* (loosely translated as the ‘talk of mediums’). Today, speech phenomena such as these tend not to be classified as hallucinations. The reason why Séglas chose to do so would seem to stem from the conceptual analogy he envisaged between obsessive thoughts and compulsive utterances and from the underlying notion of a ‘split personality’ that was assumed by him in such cases. Séglas used the term verbal impulse in opposition to \*psychomotor hallucination, a notion which he designated as a second type of psychic hallucination.

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### Verbal Transformation Effect

A term introduced in or shortly before 1958 by the American psychologist Richard M. Warren (b. 1925), and his British colleague Richard Langton Gregory (b. 1923) to denote an illusory alteration of repeated words or sentences. For example, repetition of the spoken word “Go” may yield an illusory transformation into “Goal”, “Cold”, “Now”, or “Down”. The verbal transformation effect can be classified as a \*cognitive illusion. Conceptually, it is considered analogous to a \*visual illusion called the \*reversible figure.

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### Veridical Apparition

The term veridical apparition is indebted to the Latin adjective *veridicus*, which means truthful or speaking the truth. It is used in the paranormal literature to denote an \*apparition whose presence can allegedly be corroborated empirically. See also the entries Telepathic hallucination, Coincidental hallucination, Veridical hallucination, and True hallucination.

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### Veridical Hallucination

The term veridical hallucination is indebted to the Latin adjective *veridicus*, which means truthful or speaking the truth. It has two broad sets of connotations. In the first place, it is used as a synonym for the terms \*true hallucination, \*genuine hallucination, and \*hallucination proper. In this

reading, all four terms are used in opposition to expressions such as \*false hallucination, quasi-hallucination, and \*pseudohallucination. In this mundane sense, the term veridical hallucination expresses the recognition that the hallucination in question is genuine, and not a \*dream or a product of fantasy. Second, the term veridical hallucination is used in parapsychology to denote a class of \*telepathic hallucinations. The German hallucinations researcher Edmund Parish (1861–1916) divided the class of telepathic hallucinations into veridical hallucinations and \*coincidental hallucinations. While coincidental hallucinations are assumed to merely coincide with actual events in the external world, veridical hallucinations are thought to also reflect the content of such events. Or, in the words of the British physicist and founder of the Society for Psychical Research, William Fletcher Barrett (1844–1925), “Some hallucinations correspond with an appropriate real event occurring to another person; some accident, illness, emotion or death happening at that time to a distant friend. Such hallucinations are termed *veridical* or truth-telling; their study is a branch of psychology, and is an important part of psychical research. There may be no more substantiality about such visual hallucinations than there is about the reflection of oneself in a looking-glass. The image in the mirror is veridical and caused by a neighbouring objective reality; in like manner, is a mental image coinciding with some distant unseen real occurrence; but the mental image is not derived through the organ of sense, as is the reflection seen in the mirror.” As used in the parapsychological tradition, the term veridical hallucination commonly appears in opposition to \*falsidical hallucination. The guiding principle behind this latter classification (veridical–falsidical) is the alleged relationship with actual events in the external world. In spite of the use of the adjective veridical, in the view of some authors the term veridical hallucination still has a certain connotation of subjectivity or morbidity connected with the word hallucination. In an attempt to do away with that connotation, it has been proposed to replace the term veridical hallucination by the term \*monition.

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### Vertiginous Hallucination

see Vestibular hallucination.

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### Vessel

see Tunnel.

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### Vestibular Aura

see Vestibular hallucination.

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### Vestibular Hallucination

Also referred to as vestibular aura, vestibular illusion, and vertiginous hallucination. The term vestibular hallucination refers to the vestibular organ, a term which is indebted to the Latin noun *vestibulum* (forecourt, entrance hall). It is used to denote a hallucinated type of vertigo, which may consist of such diverse sensations as dizziness, disequilibrium, light-headedness, and feelings of floating or falling. As the German psychiatrist and neurologist Georg Theodor Ziehen (1862–1950) maintains, “By means of the vestibular nerve we experience the position of our head in space. In this sensory area, too, hallucinations can occur: the diseased person feels how he is suddenly tossed into the air, how he is turned to the right or to the left, and so on.” Vertigo occurring in the context of epilepsy has been reported at least since the 18th century. It is open to debate whether a distinction between ‘true’ vertigo and a ‘hallucinated’ type of vertigo can be made on phenomenological grounds, since vertigo has itself been traditionally conceptualized as a hallucinated feeling of disequilibrium, dizziness, or movement. A more fundamental objection to the concept of the vestibular hallucination stems from the argument that a subjective experience such as vertigo can never be imagined or ‘unreal’. In philosophy this is known as the self-intimating aspect of sensory experiences. On the

other hand, it would seem defensible to suggest that feelings of vertigo mediated by the vestibulo-cortical tracts or the temporal lobe's vestibular field, for example, are etiologically different from vertigo due to vestibular or ocular disturbances and that the former might therefore be set apart as a 'central' or 'hallucinated' variant of the latter. Moreover, it has been suggested that centrally mediated vertigo tends to consist of 'pure' vertigo, in contradistinction to labyrinthine vertigo, which is more often accompanied by nystagmus and vegetative symptoms such as nausea and perspiration. Pathophysiologically, vestibular hallucinations are associated primarily with aberrant neuronal discharges in the middle and posterior gyrus temporalis superior and with such discharges in or around the sulcus interparietalis. Vestibular hallucinations occurring in the context of epilepsy are traditionally referred to as a vertiginous seizure, vestibular seizure, or vertigo epileptica. A syndrome involving vestibular hallucinations, complex involuntary movements, and \*scenic hallucinations is known as Zingerle syndrome or \*Zingerle's automatosis.

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### Vestibular Hallucinatory State

Also referred to as vestibularly evoked visual hallucination. Both terms refer to the vestibular organ, a term which is indebted to the Latin noun *vestibulum* (forecourt, entrance hall). They are used to denote a \*simple or \*geometric visual hallucination that can be evoked by means of ear irrigation with warm or cold water. As the Bulgarian otoneurologist Ognyan Kolev notes,

vestibular calorization with fluids between 20° and 44°C in healthy individuals, especially when placed in a dark environment, may give rise to \*photoptic phenomena consisting of dots, lines, circumferences, arcs, circles, stars, triangles, quadrangles, clouds, columns, and so on. These hallucinations may appear to be stationary or moving, and to be approaching or receding, while they may also undergo changes in colour and brightness. As to the neurophysiological correlates of vestibularly evoked visual hallucinations, Kolev suggests that the anatomic-functional connections between the vestibular and optical systems may play an important role, as well as the haemodynamic effects of vestibular calorization on the microcirculatory blood flow of the visual system. In 1953, the Scottish psychiatrist Alistair Sutherland Livingston Rae (1912–2006) described a case in which vestibular calorization with the aid of cold water entailed a displacement of pre-existent visual hallucinations to the left, followed by their disappearance.

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### Vestibular Illusion

see Vestibular hallucination.

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### Vestibularly Evoked Visual Hallucination

see Vestibular hallucinatory state.

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### Vestibular-Motor Hallucination

The term vestibular-motor hallucination is indebted to the Latin words *vestibulum* (forecourt, entrance hall) and *motio* (movement). It is used to denote a cluster of spatial, temporal, and orientational \*hallucinoid experiences that

may occur during episodes of \*sleep paralysis. The term was proposed in or shortly before 2003 by the Canadian psychologist and sleep researcher James Allan Cheyne to denote one of the major clusters of hallucinoid experiences found to emerge from factor-analytic studies of the \*nightmare. The cluster of vestibular-motor hallucinations includes feelings of flying, falling, and floating, as well as elevator feelings, spinning sensations, \*autoscopy, and \*out-of-body experience. Conceptually and phenomenologically, the vestibular-motor hallucination may well be related to the \*space–motion hallucination.

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## Violet Vision

see Ianothinopsia.

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## Visceral Aura

see Abdominal aura.

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## Vision

The term vision comes from the Latin noun *visio*, which means ‘sight’. It has various meanings and connotations, including the sense of sight, a mental image produced by the imagination, and a \*visual hallucination (with or without the connotation of a \*mystical experience). Visions – in the sense of visual hallucinations – were divided by the British scientist Sir Francis Galton (1822–1911) into five orders of phenomena. To Galton the lowest order of visions are the \*number forms, or \*number form synaesthesias, as they are known today, followed by the group of \*colour associations (as in \*colour hearing, another type of synesthesia). Galton’s third order of visions consists of visualized pictures arising in association with words. His fourth order consists of \*phantasmagoria, a notion closely resembling our present-day class of \*hypnagogic hallucinations, and the fifth of visual hallucinations proper.

Galton suggested that the propensity to experience visions is strongly hereditary in nature: “I have found that the peculiarities of visualisation, such as the tendency to see Number-Forms, and the still rarer tendency to associate colour with sound, is strongly hereditary, and I should infer, what facts seem to confirm, that the tendency to be a seer of visions is equally so.” He also suspected that the propensity to hallucinate is actually quite common in the general population and subject to the encouragement and discouragement by important others: “My interpretation of the matter, to a certain extent, is this – That the visionary tendency is much more common among sane people than is generally suspected. In early life, it seems to be a hard lesson to an imaginative child to distinguish between the real and visionary world. If the fantasies are habitually laughed at and otherwise discouraged, the child soon acquires the power of distinguishing them; any incongruity or nonconformity is quickly noted, the visions are found out and discredited, and are no further attended to. In this way the natural tendency to see them is blunted by repression. Therefore, when popular opinion is of a matter-of-fact kind, the seers of visions keep quiet. . . . But let the tide of opinion change and grow favourable to supernaturalism, then the seers of visions come to the front. . . . We need not suppose that a faculty previously non-existent has been suddenly evoked, but that a faculty long-smothered by many in secret has been suddenly allowed the freedom to express itself, and to run into extravagance owing to the removal of reasonable safeguards.” For further details, see the entries Visual hallucination and Visual illusion.

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## Vision of Half-Sleep

see Hypnagogic hallucination.

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## Visual Allachaesthesia

Also known as optical allachaesthesia, optical alloaesthesia, and fata morgana of the visual sphere. The first three expressions are indebted to the Greek words *allache* (elsewhere) and *aisthanesthai* (to notice, to perceive). They translate loosely as 'seeing in a different place'. All four terms are used to denote the illusory projection of a regular sense perception from one quadrant of the visual field to the diagonally opposed quadrant (hence the name fata morgana of the visual sphere). For example, a person with visual allachaesthesia may perceive a visitor standing on the right as standing in an inverted position on the left, as if this person were trodding on the ceiling. The German term *optische Alloästhesie* (i.e. optical alloaesthesia) was introduced in or shortly before 1928 by the Austrian neurologist and psychiatrist Otto Pötlz (1877–1962) and his colleague Georg Hermann. The phenomenon itself was described as early as 1895, as witness the autobiographical recording of this phenomenon by the German neurologist Ernst Beyer. As Beyer reports, he himself experienced visual allachaesthesia in the wake of one of his migraine attacks. He saw houses and a church in his left visual field, which were actually present on his right-hand side. In Beyer's case, the phenomenon was accompanied by a blurring of vision in the lower left quadrant and a \*scotoma developing from the periphery towards the central field of vision. Visual allachaesthesia tends to occur in the context of visuospatial neglect, usually due to a lesion to the right parietal lobe. However, it has also been described in hysteria, in the context of \*aurae preceding migraine attacks, and in association with lesions affecting the occipital lobe. Visual allachaesthesia is commonly classified as a \*metamorphopsia, which is itself classified as a \*sensory distortion. Visual allachaesthesia should not be confused with \*inverted vision, a condition in which objects of fixation, or the entire extracorporeal environment, are perceived as if rotated 180°.

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## Visual Anosognosia

see Anton–Babinski syndrome.

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## Visual Aura

Formerly known as suffusio. The term visual aura is indebted to the Greek noun *aura*, which means wind, breeze, or smell. It is used to denote an \*aura experienced in the visual modality. The earliest known written account of a visual aura stems from the classical physician Aretaeus of Cappadocia (c. AD 150): "... flashes of purple or black colours before the sight, or all mixed together, so as to exhibit the appearance of a rainbow expanded in the heavens." Visual auras may present as isolated \*visual hallucinations or \*illusions of a \*simple, \*geometric, or \*complex nature. Occasionally, \*lilliputian hallucinations have been reported in the context of visual aura. The visual aura may also present in the form of visual loss (i.e. as a \*scotoma or as tunnel vision). Some examples of visual auras are \*photopsias, \*visual snow, and \*scintillating scotomata. Pathophysiologically, such simple visual phenomena are associated primarily with aberrant neuronal discharges in the primary visual cortex, although other parts of the visual system may be involved as well. The occurrence of complex visual hallucinations, as well as the occurrence of tunnel vision, is associated primarily with occipitotemporal or anteromedial temporal activity. Etiologically, visual auras are associated primarily with paroxysmal neurological disorders such as migraine and epilepsy. When they constitute the initial or sole ictal manifestation of epilepsy, they are referred to as \*visual epilepsy. When visual auras occur in conjunction with hallucinations in other sensory modalities or with \*dèjà experiences, they may under cer-

tain conditions be designated as \*psychic auras. Vague or poorly defined alterations of visual perception such as 'blurring' are not customarily regarded as auras. They rather tend to be relegated to the class of 'unclassifiable auras'. Conceptually as well as phenomenologically, visual auras would seem to be related to \*dream scintillations.

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either the initial or sole ictal manifestation. Phenomenologically, epileptic visual auras typically consist of \*photopsias or \*simple hallucinations consisting of multiple dots, spots, disks, stars, balls of light, \*halos, streaks, and sometimes \*fortification spectra. These auras are often in colour. They may be stationary, but they are often described as flickering, pulsating, twinkling, expanding, contracting, or otherwise moving. Even rarer are \*complex hallucinations, \*illusions, \*metamorphopsias, and distortions of colour. The duration of these epileptic visual auras tends to be of the order of seconds rather than minutes. Pathophysiologically, visual epilepsy is associated chiefly with irritative activation of neural circuits within the visual pathways. Etiologically, it is associated primarily with conditions such as tumours, developmental malformations, and traumatic injuries.

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## Visual Autokinetic Effect

see Autokinetic effect.

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## Visual Command Hallucination

A term used to denote a \*visual text hallucination consisting of written letters or words that convey an incentive or command.

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## Visual Experience

The term visual experience was introduced in or shortly before 1928 by the German-American biological psychologist and philosopher Heinrich Klüver (1897–1979) to denote a specific subjective feeling that may accompany the \*visual hallucinations occurring in mescaline intoxication, such as \**presque vu* and \*dual system experience. Klüver distinguishes such visual experiences from hallucinations proper, as well as from \*synaesthesias, \*metamorphopsias, and other perceptual phenomena that may arise in \*mesalism, because they do not fulfil all the formal criteria of \*hallucinations proper.

### Reference

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## Visual Epilepsy

A term used to denote a relatively rare type of epilepsy in which a \*visual aura is

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## Visual Flashback

A term used to denote a type of \*flashback characterized by \*metamorphopsias, heightened



imagery, and recurrent \*visual hallucinations. The term visual flashback is used in opposition to the terms somatic flashback and emotional flashback.

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## Visual Hallucination

Also referred to as \*vision. Both terms are indebted to the Latin noun *visio*, which means sight. They are used to denote a hallucination of sight. Historically, visual hallucinations have been divided into a multitude of types. Using their perceived complexity as a guiding principle, they are commonly classified as \*elementary (or \*simple), \*geometric, and \*complex visual hallucinations. Those replacing the entire sensory environment are referred to as \*scenic or \*panoramic hallucinations. Those perceived as being located outside the visual field (such as a person 'seen' from the back of the head) are called \*extracampine hallucinations. Visual hallucinations going hand in hand with hallucinations in any of the other sensory modalities are referred to as \*compound hallucinations. Using their perceived shape as a guiding principle, visual hallucinations are classified as \*formed (or \*organized) and \*unformed hallucinations. Unformed visual hallucinations are also designated as \*photopsia, while formed visual hallucinations are known as \*morphopsia. Using their perceived size as a guiding principle, visual hallucinations have been divided into \*macroptic and \*microptic hallucinations. Visual hallucinations which feature a faithful image of oneself are known as \*autoscopic hallucinations; less faithful images are called \*heautosopic hallucinations. Those depicting animals are referred to as \*zoopsia, whereas those depicting ghosts or dead people have traditionally been referred to as \*apparitions. Visual hallucinations depicting a deceased loved one are referred to as \*bereavement hallucinations, post-bereavement hallucinations, or grief hallucinations. Visual hallucinations mediated by an ophthalmic structure (such as \*muscae volitantes and certain types of \*photopsia) are traditionally referred to as \*entoptic phenomena. In some classifications

entoptic phenomena are considered subtypes of visual hallucinations, whereas in others they are excluded from the class of \*hallucinations proper. Visual hallucinations occurring in the context of visual impairment, as in \*Charles Bonnet syndrome, are designated as \*ophthalmopathic hallucinations. Using the purported presence or absence of an extracorporeal \**point de repère* as a guiding principle, visual hallucinations have been divided into visual hallucinations proper and \*visual illusions. Visual hallucinations occurring in response to a regular sensory percept in any of the other sensory modalities (such as \*sound seeing) are referred to as \*synaesthesias. When visual hallucinations are accompanied by a compelling sense of objectivity, they are said to have a high degree of \*xenopathy. The literature on the neurophysiological correlates of visual hallucinations is as diverse as these phenomenological descriptions. In 1890, the Swedish neurologist Salomon Eberhard Henschen (1847–1930) was the first to report on visual hallucinations occurring in an individual who had a tumour within the occipital cortex. It is now generally accepted that visual hallucinations can be mediated by any part of the visual system, although not every type of visual hallucination can be mediated by any of its parts. However, the rule of thumb that the simpler types of hallucinations are associated with activity in the more peripheral structures and the more complex ones with central activity has proved to be an oversimplification. It does not do justice to complex entoptic phenomena mediated primarily by the retina, for example, and photopsias mediated primarily by the optic radiation. Another rule of thumb, which states that visual hallucinations perceived as being located in external space are associated with activity in specialized occipital cortical areas, whereas those perceived 'with the mind's eye' are not, is equally questionable. However, the rule of thumb that all visual hallucinations co-occur with aberrant neurophysiological activity in the occipital cortex is still in force. Having multiple areas of relative specialization for different visual attributes (such as contrast, texture, orientation, luminance, movement, and so on), various parts of the visual association cortex are believed to be activated in accordance with the attributes hallucinated. The occurrence of visual hallucinatory activity is attributed not only to direct stimulation of occipital areas (as in \*deafferentiation and \*experiential hallucinations, for example), but also to indirect stimulation of these occipital

areas by ascending activity originating from the limbic system (as in \*reperception), the thalamus, the pedunculus cerebri and its adjacent structures (as in \*peduncular hallucinations), the primary sensory pathways, or visually specialized regions of the temporal and frontal lobes. Etiological factors capable of affecting these regions are believed to include epileptic seizures, migraine, degenerative neuronal cell loss, stroke, infections, trauma, metabolic disturbances, the use of certain therapeutics, \*hallucinogens or other substances (as in \*drug-related hallucinations), and \*electromagnetic field disturbances. Organic risk factors for the development of visual hallucinations include \*sensory deprivation, eye diseases which diminish the transmission of light into the eye (such as cataracts and corneal scarring), retinal diseases, and Parkinson's disease. Generally speaking, visual hallucinations have been found in 11–57% of individuals with visual pathway lesions located anywhere between the retina and the primary visual cortex. Psychosocial risk factors have been found to include stress (in 85% of cases), tiredness (in 60%), loneliness (in 55%), and relational problems (in 50%). As to their co-occurrence with psychiatric disorders, visual hallucinations are found quite often in individuals with a clinical diagnosis of \*delirium, \*alcoholic hallucinosis, Alzheimer's disease and other types of dementia, \*schizophrenia, and \*flashbacks (both drug-related and in the context of post-traumatic stress disorder (PTSD)). They are encountered less often in individuals with a clinical diagnosis of mood disorder or borderline personality disorder. Because migraine has a lifetime prevalence of 12–28%, and 10–40% of all individuals acquainted with migraine are also acquainted with \*aurae, it has been suggested that the visual aura may well constitute the most prevalent type of visual hallucination.

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## Visual Halo

Also referred to as \*halo and halo vision. All three terms are indebted to the Greek noun *halōs*, which means area. In biomedicine the terms halo and visual halo are used to denote a luminous or coloured circle surrounding visually perceived stimuli or objects, notably lights. Visual halos tend to be classified either as \*visual illusions or as \*entoptic phenomena. Etiologically, they are associated primarily with a variety of ocular conditions, including corneal lesions (either traumatic or infectious in nature, or as a complication of eye surgery or laser treatment), Sattler veil, cataract, and glaucoma. They are also associated with diabetic \*hypoglycaemia, and migraine. In the past the term halo has also been used to denote what is currently known as a \*corona phenomenon, i.e. a visual illusion consisting of an extra edge around an object.

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## Visual Illusion

Also known as \*optical illusion. Both terms are commonly used to denote a visual percept that has its basis in a stimulus derivative of the extracorporeal environment (also referred to as a

*\*point de repère*) which is either misperceived or misinterpreted. The French term *point de repère* translates loosely as 'guiding mark' or 'target'. It refers to any object or stimulus that may act as the source material for the development of an illusion. Thus a cloud may form the *point de repère* for an illusory face or animal, and a tree-trunk for the illusory perception of a human figure. The class of visual illusions constitutes an exceptionally rich plethora of individual phenomena, some of which can be observed in nature (such as the *\*rainbow*, the *\*mirage*, and the colours of the peacock's feather) and some of which form the basic ingredients of everyday visual perception (such as the *\*afterimage* and the *\*aftereffect*). When visual illusions arise out of a random pattern such as clouds or a stain on the wall, they are referred to as *\*pareidoliae*. Because visual illusions have the capacity to shed light on the workings of the perceptual system, experimental psychologists have designed a vast group of synthetic phenomena that also fall into this category. The classification of visual illusions is bewilderingly diverse. In some classifications, the term illusion is even applied to phenomena lacking a source in the external environment, such as *\*scotomata* (associated with migraine), and the filling-in of the *\*blind spot*. In 1881 the British psychologist James Sully (1842–1923) divided *\*illusions* into *\*active illusions* and *\*passive illusions*, as a means of designating the relative contribution of perceptual and cognitive processes in their mediation. On the basis of their indebtedness to both subjective and objective elements of perception, the group of visual illusions has been divided into *\*physical illusions*, *\*physiological illusions*, and *\*cognitive illusions*. In this context the term physical illusion refers to an illusion arising primarily as a consequence of the physical properties of an object or stimulus in the external world. Thus physical illusions are conceptualized as naturally occurring phenomena that can theoretically be observed by any person with proper vision. Some examples of physical illusions are the rainbow, the mirage, the *\*antheion*, mirror images, and the Moiré pattern. The term physiological illusion is used to denote an illusion arising as a consequence of the perceptual system's inherent characteristics. The occurrence of this type of illusion is as inevitable as is the physical illusion, but it is not an objectively observable phenomenon. Some examples of illusions placed in this category are the afterimage, the aftereffect, and the contrast effect. The term

cognitive illusion is reserved for those illusions most indebted to an active contribution of the brain's (or mind's) unconscious inferences about the nature of the physical world. Some examples of phenomena commonly designated as cognitive illusions are *\*geometric-optical illusions*, so-called impossible figures (as in the drawings by the Dutch graphic artist Maurits Cornelis Escher (1898–1972)), *\*Jastrow's duck-rabbit*, and the *\*Necker cube*. A further subdivision of each of these three classes of illusions has been proposed by the British psychologist Richard Langton Gregory (b. 1923). In an effort to do justice to the various effects elicited by physical, physiological, and cognitive illusions, Gregory proposes that each category be further divided into four subcategories, referred to as *\*ambiguous illusions*, *\*distortion illusions*, *\*paradox illusions*, and *\*fiction illusions*. In 1959 the term visual illusion was used in a somewhat different sense by the Canadian neuroscientists Wilder Graves Penfield (1891–1976) and Sean Francis Mullan (b. 1925). These authors used the term to denote a qualitative change in visual perception in which things seem clearer or blurred, nearer or farther, larger or smaller, fatter or thinner. Judging by the examples given by Penfield and Mullan, their conception of the notion of visual illusion seems to come close to the notion of *\*metamorphopsia*. As used by these authors, visual illusions are classified as *\*psychical illusions*, which are in turn classified as *\*psychical states* (i.e. as *\*aurae* occurring in the wake of an epileptic seizure or during a cortical probing experiment). In the specific context of Penfield and Mullan's work, the term visual illusion is used in opposition to the terms *\*auditory illusion*, *\*illusion of recognition*, *\*illusional emotion*, and a nameless remaining group containing relatively rare phenomena such as illusions of increased awareness, illusions of alteration in the speed of movements, and visuo-vestibular disturbances.

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## Visual Imagery

see Imagery.

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## Visual Inattention

Also known as hemispatial visual inattention and relative hemianopia. The term visual inattention is indebted to the Latin words *in* (not) and *attentio* (attention, notice). It is used to denote a failure to detect a visual stimulus presented in one field of vision, while a rival stimulus is simultaneously presented to the opposite field of vision. The Austrian psychiatrist and neurologist Gabriel Anton (1858–1933) is commonly credited with describing the condition for the first time in 1899. The neurophysiological correlates of visual inattention are only partly known. The condition has been described mainly in individuals with parietal lesions due to infarction, but it also occurs in individuals without any demonstrable parietal lesions. Visual inattention due to a progressive parietal lesion may develop into \*hemianopia. In clinical practice it may be somewhat of a challenge to distinguish between the two conditions. The notion of visual inattention should not be confused with \*inattentional blindness.

### References

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- Critchley, M. (1953). *The parietal lobes*. London: Edward Arnold & Co.
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## Visual Motion Blindness

see Akinetopsia.

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## Visual Perseveration

Also known as perseveration. Both terms are indebted to the Latin verb *perseverare*, which means to maintain or to keep on stating. The term visual perseveration was introduced in or shortly before 1949 by the British neurologist Macdonald Critchley (1900–1997) to denote the illusory reoccurrence of visual percepts after the stimulus-object has moved out of focus. As Critchley explains, “This experience is not ordinarily a persistent one, but is intermittent. Only very rarely can it be demonstrated at will. There are two main varieties, namely: (1) visual perseveration in time, or *paliopsia*; and (2) *illusory visual spread*, a visual extension, expansion, and elongation; in other words, a kind of spatial perseveration of objects seen.” A third variety of visual perseveration is the \*trailing phenomenon. As to the pathophysiology of visual perseveration, it has been suggested that the visual parietal regions may be involved. Visual perseveration is commonly classified as a \*reduplicative phenomenon or as a type of \*metamorphopsia (which is itself classified as a \*sensory distortion). Conceptually, it is related to reduplicative phenomena occurring in any of the other sensory modalities. Thus perseveration in the auditory modality is referred to as auditory perseveration or \*palinacusic, and perseveration in the tactile or somatosensory modality as perseverative somesthetic sensation or \*palinaesthesia. Irrespective of the sensory modality involved, perseveration tends to be associated in an etiological sense with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy and with the use of \*hallucinogens such as LSD and mescaline. The term perseveration is also used in psychiatry to denote a formal thought disorder characterized by the aimless repetition of words, sentences, or themes.

### References

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- Critchley, M. (1953). *The parietal lobes*. London: Edward Arnold & Co.
- ffytche, D.H., Howard, R.J. (1999). The perceptual consequences of visual loss: ‘Positive’ pathologies of vision. *Brain*, 122, 1247–1260.

Klee, A., Willanger, R. (1966). Disturbances of visual perception in migraine. *Acta Neurologica Scandinavica*, 42, 400–414.

Santhouse, A., Howard, R., ffytche, D. (2000). Visual hallucinatory syndromes and the anatomy of the visual brain. *Brain*, 123, 2055–2064.

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## Visual Phantasma

A term used in the older (i.e. pre-esquirolian) literature to denote what is now commonly called a \*visual hallucination.

### Reference

Müller, J. (1826). *Ueber die phantastischen Gesichterscheinungen*. Koblenz: Hölscher.

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## Visual Phantom Double

see Autoscopic hallucination.

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## Visual Sleep Start

A term used to denote a \*photopsia (i.e. a flash of light) which may occasionally accompany the \*auditory sleep start. Phenomenologically, the visual sleep start shows certain similarities to the \*sound phosphene. For a further explanation, see the entry Exploding head syndrome.

### Reference

Pearce, J.M. (1988). Exploding head syndrome. *Lancet*, 2, 270–271.

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## Visual Snow

Also known as aeropsia. Both terms refer to a \*simple visual hallucination depicting television-like static. Visual snow may be either transient or permanent, and it may affect either the whole visual field, or one or more parts of it. In conformity with the \*dimensions of visual imagery devised by the American psychopharmacologists Ronald K. Siegel and Murray E. Jarvik, visual snow can also be designated as a visual hallucina-

tion of a random form dimension. As is the case with \*photopsia and other simple visual hallucinations, visual snow may be mediated either peripherally or centrally. It has been described in association with numerous conditions, including intoxication with \*hallucinogens such as LSD and mescaline, in \*hallucinogen-induced persistent perception disorder (HPPD), and as a complication of migraine with aura called \*persistent aura without infarction.

### Reference

Siegel, R.K., Jarvik, M.E. (1975). *Drug-induced hallucinations in animals and man*. In: *Hallucinations. Behavior, experience, and theory*. Edited by Siegel, R.K., West, L.J. New York, NY: John Wiley & Sons.

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## Visual Speech Hallucination

see Visual verbal hallucination.

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## Visual Text Hallucination

A term used to denote a \*visual hallucination consisting of written letters or words. When these letters or words convey an incentive or command, they are referred to as \*visual command hallucinations. Visual text hallucinations can be classified as a type of \*orthographic hallucination or as a type of \*visual verbal hallucination.

### Reference

ffytche, D.H., Lappin, J.M., Philpot, M. (2004). Visual command hallucinations in a patient with pure alexia. *Journal of Neurology, Neurosurgery and Psychiatry*, 75, 80–86.

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## Visual Tilting

see Environmental tilt.

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## Visual Verbal Hallucination

Also known as logopsia, graphic hallucination, graphic speech hallucination, and visual speech

hallucination. The French term *hallucination verbale visuelle* (i.e. visual verbal hallucination) was introduced in or shortly before 1888 by the French psychiatrist Louis Jules Ernest Séglas (1856–1939) to denote a \*verbal hallucination taking the form of visually hallucinated letters, words, writing movements or hieroglyphs. Two special variants of the visual verbal hallucination are the hallucination in \*braille and the \*visual command hallucination.

### References

- Goldstein, K. (1908). Zur Theorie der Hallucinationen. Studien über normale und pathologische Wahrnehmung. *Archiv für Psychiatrie und Nervenkrankheiten*, 44, 1036–1106.
- Ey, H. (2004). *Traité des hallucinations. Tome 1*. Paris: Claude Tchou pour la Bibliothèque des Introuvables.
- Séglas, J. (1888). L'hallucination dans ses rapports avec la fonction du langage; – les hallucinations psycho-motrices. *Progrès Médical*, 33/34, 124–126.

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## Visuo-vestibular Splitting of the Somatosensory Body Image

see Out-of-body experience (OBE or OBEE).

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## Vital Sensations, Distortions of

The German term *Vitalempfindung*, or vital sensation, was used by the German psychiatrist and philosopher Karl Jaspers (1883–1969) to denote any bodily sensation that induces awareness of the bodily state. Distortions of these vital sensations are believed to be capable of triggering bizarre somatic phenomena in the border region between \*haptic hallucinations, \*somatic hallucinations, \*body schema illusions, and disturbances of coenesthetic feeling (or \*coenesthetic hallucinations, as they are sometimes referred to). As Jaspers wrote, “Reports from patients about their bodily sensations are inexhaustible. They feel turned into stone, dried up, shrunk, tired, empty, hollow or blocked. Sensations such as these cannot but alter the feeling of bodily existence. The patient feels he is a soap-bubble, or that his limbs are made of glass or describes himself in one or other of the countless ways in which patients try to depict

their feelings.” As noted by Jaspers, it is difficult in such instances – both clinically and conceptually – to discriminate between bodily sensations, hallucinations, and delusional interpretations of the underlying perceptual events.

### Reference

- Jaspers, K. (1997). *General psychopathology. Volume 1*. Translated by Hoenig, J., Hamilton, M.W. Baltimore, MA: Johns Hopkins University Press.

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## Vitreous Floaters

see *Muscae volitantes*.

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## Vivid Hallucination

A term used to denote a \*visual hallucination that stands out because of its brightness, vivacity, or liveliness. As noted by the American philosopher C. Wade Savage, in this particular context the somewhat ambiguous adjective ‘vivid’ tends to be used in at least four different ways. It can mean bright or saturated (in the sense of a brightly coloured hallucination or one executed in saturated colours), it can mean life-like (as in a hallucinated object or person that is phenomenologically indistinguishable from an actual object or person), it can mean ‘projected’ (i.e. as if actually present in extracorporeal space), and it can mean compelling (in the sense that the hallucination in question compels the affected individual of its true nature). In the latter case, hallucinations are also said to have a high degree of \*xenopathy. The German psychiatrist and philosopher Karl Jaspers (1883–1969) considers vividness a particularly important feature of hallucinations, especially in comparison with the lack of vividness that is deemed characteristic of \*pseudohallucinations. It should be noted that hallucinations can indeed be as vivid as regular sense perceptions and that they can even surpass them in their degree of vividness, as in individuals with poor visual acuity who may perceive sharply focused hallucinated images against a blurred background.

**References**

- Jaspers, K. (1963). *Zur Analyse der Trugwahrnehmungen (Leibhaftigkeit und Realitätsurteil)*. In: *Gesammelte Schriften zur Psychopathologie*. Berlin: Springer-Verlag.
- Savage, C.W. (1975). *The continuity of perceptual and cognitive experiences*. In: *Hallucinations. Behavior, experience, and theory*. Edited by Siegel, R.K., West, L.J. New York, NY: John Wiley & Sons.

**Vivid Physical Awareness**

The expression vivid physical awareness is a translation of the German term *leibhafte Bewusstheit*. The latter term was used by the German psychiatrist and philosopher Karl Jaspers (1883–1969) to denote what is generally known as \*sensed presence. Both terms are used as synonyms for somaesthetic doppelgänger, somaesthetic phantom double, false proximate awareness, and *Anwesenheit*.

**Reference**

- Jaspers, K. (1997). *General psychopathology. Volume 1*. Translated by Hoenig, J., Hamilton, M.W. Baltimore, MA: Johns Hopkins University Press.

**Voice-Hallucination**

see Verbal auditory hallucination (VAH).

**Voices**

see Verbal auditory hallucination (VAH).

**Voluminous Mental State**

see Dreamy state.

**Voluntary Hallucination**

The French term *hallucination volontaire*, or voluntary hallucination, was introduced in or shortly before 1899 by the French physician Pierre Dheur to denote a type of hallucination that can be summoned up by individuals with a \*hallucinatory disposition, for example by assuming a certain bodily position or steering their thoughts in a certain direction. As Dheur wrote, "It is true that the will has no direct and immediate influence upon the formation of images, but it is no less true that we often have the power to retain images, or even to reawaken them by assuming a favourable position. It is in this sense that the representation can be said to be voluntary, and it is in this same sense that we apply the word to hallucinations." Dheur characterized voluntary hallucinations as follows. "So we designate voluntary hallucinations as those in which an individual is able to see an object or hear a sound with equal ease as a normal person can represent that object mentally." He introduced the notion of the voluntary hallucination in order to tone down the classical doctrine that hallucinations are invariably of an involuntary nature. The term voluntary hallucination has also been employed as a synonym for the term \*eidetic image.

**Reference**

- Dheur, P. (1899). *Les hallucinations volontaires (l'état hallucinatoire). Suivi d'un chapitre sur les hallucinations. Notes manuscrites et inédites du Dr. J. Moreau (de Tours)*. Paris: Société d'Éditions Scientifiques.

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# W

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## Waking Dream

A generic term for a group of dream-like phenomena occurring during a state of relative wakefulness. This group of phenomena includes \*hypnagogic and \*hypnopompic hallucinations, \*daydreams, and instances of \*lucid dreaming. Waking dreams are distinguished from hallucinations proper because they occur to the half-waking mind and because of their tendency to replace the entire sensory environment. They are distinguished from \*sleep dreams because of the mind's active awareness of their contents.

### Reference

Watkins, M. (2003). *Waking dreams. Third edition*. Putnam, CT: Spring Publications.

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## Waking Fantasy

see Daydream.

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## Waking-Nightmare Hallucination

Also known as w-nightmare hallucination and \*night-mare. The term waking-nightmare hallucination was proposed in or shortly before 2003 by the Canadian psychologist and sleep researcher

James Allan Cheyne to denote a \*hypnagogic or \*hypnopompic hallucination of a frightening nature that may occur during episodes of \*sleep paralysis. As Cheyne argues, the term waking-nightmare hallucination seeks to reinstate the prototypical, 19th-century referents of the term nightmare. The term nightmare was rejected by him on the grounds that during the first half of the 20th century it came to refer to prolonged, frightening dreams from which the dreamer would typically awake.

### Reference

Cheyne, J.A. (2003). Sleep paralysis and the structure of waking-nightmare hallucinations. *Dreaming*, 13, 163–179.

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## Wasting and Hallucinations

see Fasting-Induced hallucination.

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## Waterfall Effect

see Waterfall illusion.

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## Waterfall Illusion

Also known as waterfall effect and waterfall phenomenon. All three terms refer to a variant of the



\*motion aftereffect characterized by an optical \*illusion of upward motion in stationary objects. The term waterfall illusion was coined in or shortly before 1880 by the British physicist Silvanus Phillips Thompson (1851–1916). The introduction of the term waterfall effect has been attributed to the British psychologist Richard Langton Gregory (b. 1923) and the introduction of the term waterfall phenomenon to the American optometrists Horace B. Barlow (b. 1921) and Richard M. Hill. The Greek philosopher Aristotle (384–322 BC) has been credited with being the first author to describe the phenomenon, referring to it as \*river illusion. The first modern description of the waterfall illusion can be found in a paper published in 1834 by the chemist and natural philosopher Robert Addams. Addams reported the phenomenon after having observed it at the Falls of Foyers, on the borders of Loch Ness, Scotland. The waterfall illusion can be induced by looking for some time at a descending mass of water and then shifting one's gaze to the stationary objects in the environment. These stationary objects then appear to be moving in the opposite direction. The waterfall illusion is commonly classified as a \*physiological illusion. Physiologically, the waterfall illusion and other motion aftereffects have been associated with a process called neural adaptation, i.e. a selective response of neurons in the visual association cortex to movement in the visual field. A movement aftereffect that has been classified by some as a special variant of the waterfall illusion is known as \*Archimedes's spiral. The waterfall illusion should not be confused with the \*hyrcic hallucination.

### References

- Addams, R. (1834). An account of a peculiar optical phaenomenon seen after having looked at a moving body, &c. *London and Edinburgh Philosophical Magazine and Journal of Science*, 5, 373–374.
- Barlow, H.B., Hill, R.M. (1963). Evidence for a physiological explanation of the waterfall phenomenon and figural aftereffects. *Nature*, 200, 1434–1435.
- Gregory, R.L. (1981). *Eye and brain. Third revised edition*. New York, NY: McGraw-Hill.
- Mather, G., Verstraten, F., Anstis, S. (1998). *The motion aftereffect: A modern perspective*. Cambridge, MA: MIT Press.
- Thompson, P. (1880). Optical illusions of motion. *Brain*, 3, 289–298.

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## Waterfall Phenomenon

see Waterfall illusion.

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## Wernicke's Definition of Hallucinations and Illusions

In 1900 the German neurologist Carl Wernicke (1848–1904) defined hallucinations and \*illusions as follows: “Hallucinations are sensory perceptions that arise without the stimulation of the sense organ in question by an external object, merely as a consequence of internal stimuli, [whereas] illusions are false perceptions, failures to appreciate genuine objects of perception that are actually available.”

### Reference

- Wernicke, C. (1900). *Grundriss der Psychiatrie*. Leipzig: Verlag von Georg Thieme.



**Fig. 1** Carl Wernicke

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### White Hemianopia

see Hemianopia.

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### White Rainbow

see Ulloa circle.

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### Whole Body Macrosomatognosia

Also referred to as total body macrosomatognosia. Both terms are used to denote a type of \*macrosomatognosia in which the whole body is experienced as disproportionately large. They are used in opposition to the term \*partial macrosomatognosia.

#### Reference

Podoll, K., Robinson, D. (2000). Macrosomatognosia and microsomatognosia in migraine art. *Acta Neurologica Scandinavica*, 101, 413–416.

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### Whole Body Microsomatognosia

Also referred to as total body microsomatognosia. Both terms are used to denote a type of \*microsomatognosia in which the whole body is experienced as disproportionately small. They are used in opposition to the term \*partial microsomatognosia.

#### Reference

Podoll, K., Robinson, D. (2000). Macrosomatognosia and microsomatognosia in migraine art. *Acta Neurologica Scandinavica*, 101, 413–416.

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### Whole Body Schema Illusion

see Body schema illusion.

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### Windmill Illusion

Also known as \*kinetic depth effect. The term windmill illusion was introduced in or shortly

before 1860 by the German army physician Wilhelm Joseph Sinsteden (1803–1891). It refers to the inability to identify the direction of rotation of the revolving blades of a windmill when the blades are seen from a distance, and in silhouette. As seen from such a point of view, the apparent direction of rotation of the blades may reverse itself, until it is no longer possible to tell which is the true direction. The phenomenon itself was described as early as 1738 by the British mathematician Robert Smith (1689–1768). The windmill illusion is commonly classified as a \*physiological illusion.

#### References

Miles, W.R. (1931). Movement interpretation of the silhouette of a rotating fan. *American Journal of Psychology*, 48, 392–405.  
 Sinsteden, W.J. (1860). Über ein neues pseudoskopisches Bewegungsphänomen. *Poggendorffs Annalen der Physik und Chemie*, 187, 336–339.

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### Withdrawal Hallucination

A term used to denote a hallucination which occurs in the context of withdrawal from a chemical substance such as alcohol, a drug, or therapeutic. Some common examples of withdrawal hallucinations are alcohol withdrawal hallucination, cocaine withdrawal hallucination, benzodiazepine withdrawal hallucination, and Baclofen withdrawal hallucination.

#### Reference

Bayard, M., McIntyre, J., Hill, K.R., Woodside, Jr., J. (2004). Alcohol withdrawal syndrome. *American Family Physician*, 69, 1443–1450.

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### Wizard of Floyd

see *Dark Side of the Rainbow*.

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### W-Nightmare Hallucination

see Waking-nightmare hallucination.

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**Wonderland Syndrome**

see Alice in Wonderland syndrome.

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**Wundt–Fick Illusion**

see Top hat illusion.

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# X

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## Xanthopsia

Also known as yellow vision and yellowish vision. The term xanthopsia comes from the Greek words *xanthos* (yellow) and *opsis* (seeing). It is used to denote a \*chromatopsia (i.e. a temporary aberration of colour vision) in which whites are seen as yellowish and blues as less intense. Pathophysiologically, xanthopsia is associated primarily with changes in the eye's lens system. Etiologically, it is associated primarily with cataract, and with systemic exposure to therapeutics such as thiazides, sulphonamides, barbiturates, digitalis, and picric acid. In classic references xanthopsia is also attributed to jaundice and to hysteria. Xanthopsia tends to be classified as an \*entoptic phenomenon. The term is used in opposition to the terms \*cyanopsia (blue vision), \*chloropsia (green vision), \*erythroptopsia (red vision), and \*ianthiopsia (violet or purple vision).

### References

- Lawrenson, J.G., Kelly, C., Lawrenson, A.L., Birch, J. (2002). Acquired colour vision deficiency in patients receiving digoxin maintenance therapy. *British Journal of Ophthalmology*, 86, 1259–1261.
- Pinckers, A., Cruysberg, J.R.M., Liem, T.A. (1989). Chromatopsia. *Documenta Ophthalmologica*, 72, 385–390.

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## Xenopathic Character

see Xenopathic syndrome.

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## Xenopathic Syndrome

Also referred to as xenopathic character. The French term *syndrome xéno-pathique* was introduced in or shortly before 1928 by the French psychiatrist Pierre Lelong to denote the compelling sense of objectivity that may lend hallucinations a quality similar to that of objects existing in the extracorporeal world. Lelong conceptualized hallucinations as dissociated or depersonalized mental elements, and argued that these mental elements can develop into \*incomplete hallucinations, and then into \*complete hallucinations. He called the compelling sense of objectivity characteristic of complete hallucinations their xenopathic character. As he maintained, "At the very moment a certain representation enters the conscious mind, the subject has the positive sensation of an exterior object. The qualities of a personal reflection suddenly make [him] discern a transmitted thought, a pain is felt as natural or provoked. Xenopathy, the morbid principle underlying the mental disorder, firmly shakes one's basis for critique: the madness of faith is its facile consequence." Lelong distinguished the xenopathic syndrome from other sources of confusion

over the hallucination's ontological status, such as diminished insight, and diminished reality-monitoring capacities.

**Reference**

Lelong, P. (1928). *Le problème des hallucinations*. Paris: Librairie J.-B. Baillière et Fils.

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**Xenopathy**

see Xenopathic syndrome.

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# Y

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## Yellow Vision

see Xanthopsia.

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**Zeitlupenphänomen**

see Protracted duration.

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**Zeitrafferphänomen**

see Quick-motion phenomenon.

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**Ziehen's Definition of Hallucinations**

In 1911 the German psychiatrist and neurologist Georg Theodor Ziehen (1862–1950) defined hallucinations as follows: "A hallucination is a sense perception without an external stimulus."

**Reference**

Ziehen, Th. (1911). *Psychiatrie. Für Ärzte und Studierende bearbeitet. Vierte, vollständig umgearbeitete Auflage*. Leipzig: Verlag von S. Hirzel.

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**Zingerle's Automotosis**

Also known as Zingerle syndrome. Both eponyms refer to the Austrian psychiatrist and neurologist Hermann Zingerle (1870–1935). Zingerle introduced the German neologism *Automatose* in or shortly before 1924 to denote a syndrome characterized by hallucinations and complex motor

phenomena. The eponym Zingerle syndrome was introduced in his honour by the Swiss neurologist Georges de Morsier (1894–1982). The hallucinations occurring in the context of automatosis were described by Zingerle as predominantly \*scenic and \*vestibular in nature. The motor phenomena (such as walking, crawling, compulsive posturing, torticollis, involuntary turning movements, choreo-athetotic movements, and myoclonus) were described by him as occurring either spontaneously or in response to specific provocation tests. In an experimental setting, involuntary turning movements could be evoked by him in some individuals by forcing them into an upright or reclining position, whereas in others choreo-athetotic movements could be evoked by exerting pressure on specific body parts. Moreover, Zingerle described the motor phenomena occurring in the context of automatosis as being intimately connected with the hallucinated scenes. As he wrote in 1925, "Lively sensory deceptions and dream-like scenic experiences occurred, not accidental ones, but ones that rather stood in close relation with the automatic movements and postural changes... Turning movements of the body, drawing oneself up to various bodily positions, entailed quite specific sensory deceptions of climbing, falling, swimming, turning around in a circle, and so on. These sensory deceptions, evoked by the automatic postural changes of the body, are the prevailing ones, from which the additional scenic hallucinations and experiences would seem to follow only secondarily." Etiologically, Zingerle associated automatosis with medical conditions such as alcohol intoxication

and neurosyphilis, as well as with non-organic or functional conditions which he designated as neuropathy. As to the pathophysiology of automatosis, he envisaged a central role for “disinhibition phenomena due to sensory or motor disorders,” and, in the so-called functional cases, “a lasting constitutional peculiarity of many neuropaths in whom we so often find lasting alterations of other reflexes as well.” It has been suggested by the British neuroscientist Dominic H. ffytche that the neurobiological correlate of Zingerle’s automatosis may be a parietal lesion involving vestibular, motor, and pulvino-cortical pathways. Conceptually as well as phenomenologically, Zingerle’s automatosis is related to \*automatisms.

### References

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- Starobinski, J. (1983). Georges de Morsier (1894–1982). *Gesnerus*, 40, 335–338.
- Zingerle, H. (1925). Weitere Untersuchungen über Automatoze. *Journal für Psychologie und Neurologie*, 31, 400–418.

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## Zingerle Syndrome

see Zingerle’s automatosis.

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## Zoanthropy

see Clinical lycanthropy.

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## Zöllner Illusion

The eponym Zöllner illusion refers to the German astrophysicist Johann Karl Friedrich Zöllner (1834–1882). It is used to denote a \*geometric-optical illusion in which parallel lines seem to diverge when one of the lines is intersected by short diagonal lines slanting in one direction and the other by similar lines slanting in the other direction. Zöllner has been credited with being the first to describe the phenomenon in 1860, although a similar description has been found in the work *Apologie de Raimond Sebond*

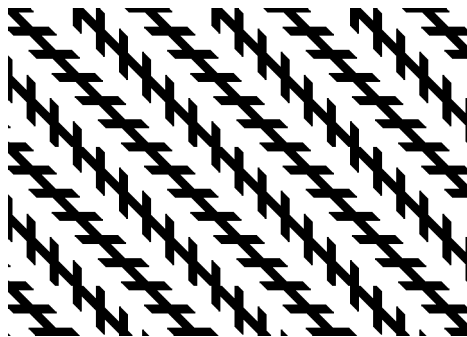


Fig. 1 Zöllner illusion

by the French philosopher and politician Michel Eyquem de Montaigne (1533–1592). The Zöllner illusion is commonly classified as a \*physiological illusion.

### References

- Johannsen, D.E. (1971). Early history of perceptual illusions. *Journal of the History of the Behavioral Sciences*, 7, 127–140.
- Zöllner, F. (1860). Über eine neue Art von Pseudoskopie und ihre Beziehungen zu den von Plateau und Oppel beschriebenen Bewegungsphaenomenen. *Poggendorffs Annalen der Physik und Chemie*, 110, 500–523.

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## Zombification

see Twilight state and hallucinations.

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## Zoom Vision

A term used to denote a \*visual illusion caused by a gradual change from regular visual perception to either macroptic or microptic vision. Macroptic vision, or \*macropsia, is a visual illusion characterized by a \*magnification of objects and stimuli present in the extracorporeal world. Likewise, microptic vision or \*micropsia is a visual illusion characterized by a \*minification of objects and



stimuli present in the external world. Zoom vision is characterized by a gradual opening-out, or closing-down, in the perceived size of objects and stimuli, as if they were observed with the aid of a zoom lens. Etiologically, zoom vision is associated primarily with \*aurae occurring in the context of paroxysmal neurological disorders such as migraine and epilepsy. It has also been described in the context of intoxication with \*hallucinogens such as LSD and mescaline. Arguably the most famous descriptions of zoom vision stem from the children's book *Alice's Adventures in Wonderland* by Lewis Carroll (1832–1898). Since Carroll probably suffered from migraine, it was suggested in 1952 by the American neurologist Caro W. Lippman (1886–1954) that the author may have experienced zoom vision himself. When zoom vision occurs in conjunction with other types of \*sensory distortions and/or \*sensory deceptions, it is sometimes referred to as an \*Alice in Wonderland syndrome.

### References

- Carroll, L. (1865). *Alice's adventures in Wonderland*. New York, NY: Appleton.
- Lippman, C.W. (1952). Certain hallucinations peculiar to migraine. *Journal of Nervous and Mental Diseases*, 116, 346–351.
- Sacks, O. (1992). *Migraine. Revised and expanded*. New York, NY: Vintage Books.

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## Zoopsia

The term zoopsia derives from the Greek words *zōion* (living creature, animal) and *opsis* (seeing). It is used to denote an \*illusion or \*complex visual hallucination depicting one or more animals, such as cats, dogs, tigers, elephants, snakes, rodents, or insects. These hallucinated animals may have a realistic appearance, but they can

also be cartoonish in nature or take the form of mythical or fantasy creatures. It has been suggested that the apparent size of the hallucinated animals may be dependent on the point of ocular fixation. As noted by the Swiss physician Ferdinand Morel (1888–1957), a fixation point at 1 m may result in the seeing of mice, at 2 m in the seeing of pigeons, and at 3 m in the seeing of cats and rabbits. Etiologically, zoopsia is associated with a variety of conditions, including \*Charles Bonnet syndrome, \*peduncular hallucinosis, \*delirium, \*delirium tremens, \*alcoholic hallucinosis, \*cocaine hallucinosis, and many other substance-induced hallucinatory syndromes. According to the French psychiatrist Henri Ey (1900–1977), zoopsia can be conceptualized as a typical expression of fear or terror. As noted by him, the visual hallucinations of zoopsia have a certain tendency to develop into \*compound hallucinations, notably in combination with olfactory and/or tactile sensations, and less often in combination with verbal auditory ones. A related symptom in which vermin are perceived (tactically and/or visually) as crawling upon or beneath the skin is known as formication or \*formicative hallucination.

### References

- Ey, H. (2004). *Traité des hallucinations. Tome 1*. Paris: Claude Tchou pour la Bibliothèque des Introuvables.
- ffytche, D.H. (2007). Visual hallucinatory syndromes: Past, present, and future. *Dialogues in Clinical Neuroscience*, 9, 173–189.
- Morel, F. (1937). Hallucination et champ visuel. De la texture, de la forme, de la multiplicité, des mouvements que présentent les hallucinations visuelles du delirium tremens. *Annales Médico-psychologiques*, 95, 742–757.