Square [brackets] enclose editorial explanations. Small ·dots· enclose material that has been added, but can be read as though it were part of the original text. Occasional Ÿbullets, and also indenting of passages that are not quotations, are meant as aids to grasping the structure of a sentence or a thought. Four ellipses . . . . indicate the omission of a brief passage that seems to present more difficulty than it is worth.
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TREATISE OF HUMAN NATURE

By David Hume

Book I: The understanding

Part ii: The ideas of space and time

Section 1_{ii}: The infinite divisibility of our ideas of space and time

When a philosopher comes up with something that looks like a paradox and is contrary to basic beliefs of ordinary folk, ·it often fares better than it deserves, for two reasons·. ŸIt is greedily embraced by philosophers, who think it shows the superiority of their discipline that could discover opinions so far from common beliefs. ŸWhen something surprising and dazzling confronts us, it gives our minds a pleasurable sort of satisfaction that we can't think is absolutely baseless. These dispositions in Ÿphilosophers and Ÿtheir disciples give rise to a relation of mutual comfort between them: Ÿthe former furnish many strange and unaccountable opinions, and Ÿthe latter readily believe them. I can't give a plainer example of this symbiosis than the doctrine of *infinite divisibility*. It will be the first topic in my discussion of the ideas of space and time.

Everyone agrees - and the plainest observation and experience makes it obvious - that the capacity of the mind is limited, and can never attain a full and adequate conception of infinity. It is also obvious that whatever is capable of being divided in infinitum must consist of an infinite number of parts: if you set bounds to the number of parts, you thereby set bounds to the ·possible· division. It doesn't take much work to conclude from this that the idea we form of any finite quality is *not* infinitely divisible, and that by proper distinctions and separations we can reduce it to lesser ideas that are perfectly simple [= ‘without parts’] and indivisible. In denying that the mind’s capacity is infinite we are supposing that it will *come to an end* in the division of its ideas; and there is no possible escape from this conclusion.

So it is certain that the imagination reaches a minimum, and can form in itself an idea of which it can’t conceive any subdivision - one that can’t be diminished without a total annihilation. When you tell me of Ÿthe thousandth and Ÿten thousandth part of a grain of sand, I have a distinct idea of these numbers and of their different proportions; but the images I form in my mind to represent the things themselves are not different from each other and are not smaller than the that image by which I represent Ÿthe grain of sand itself, which is supposed to be so much bigger. What consists of parts is distinguishable into them, and what is distinguishable is separable. But, whatever we may imagine of *the thing*, the *idea of* a grain of sand is not distinguishable or separable into twenty different ideas - much less into a thousand, ten thousand, or an infinite number of them!

The impressions of the senses are the same in this respect as the ideas of the imagination. Put a spot of ink on paper, fix your eye on that spot, and move away just far enough so that you lose sight of it: it is obvious that the moment before it vanished the image or impression ·of the spot· was perfectly indivisible. Why do small parts of distant bodies not convey any sensible impression to us? It is not for lack of rays of light ·from them· striking our eyes. Rather, it is because they are further away than the distance at which their impressions Ÿwere reduced to a minimum and Ÿcouldn’t be diminished any further. A telescope that makes them visible doesn’t produce any new rays of light, but merely *spreads out* the rays that always flowed from them: in that way the telescope Ÿgives parts to impressions that had appeared simple and uncompounded to the naked eye, and Ÿadvances to a minimum what was formerly imperceptible. The explanation of what a microscope does is essentially the same.

From this we can discover the error of the common opinion that the capacity of the mind is limited on both sides, and that the imagination cannot possibly form an adequate idea of anything below a certain size or above a certain size. Nothing can be more minute than some ideas that we form in the imagination, and some images that appear to the senses, for there are ideas and images that are perfectly simple and indivisible, ·and nothing can be smaller than that·. The only defect of our senses is that they give us wrongly proportioned images of things, representing as tiny and uncompounded what is really large and composed of a vast number of parts. We aren’t aware of this mistake. ·Take the example of a very tiny insect such as a mite·. When we see a mite we take that impression to be equal or nearly equal in size to the mite itself; then finding by reason that there are objects much smaller than that - ·for example, the small parts of the mite· - we rashly conclude that these things are smaller than any idea of our imagination or impression of our senses. But it is certain that we can form ideas that are no bigger than the smallest atom of the animal spirits of an insect a thousand times smaller than a mite. [‘Animal spirits’ were thought to be extremely finely divided fluids in animal bodies - more fluid and finely divided than air or water.] We ought rather to conclude that the difficulty lies in enlarging our conceptions enough to form a just notion of *a mite*, or even of *an insect a thousand times less than a mite*. For in order to form a just notion of these animals we must have a distinct idea representing each part of them; and that, according to the system of infinite divisibility, is utterly impossible, and according to the system of indivisible parts or atoms it is extremely difficult because of the vast number and multiplicity of these parts.

Section 2_{ii}: The infinite divisibility of space and time

When ideas adequately represent objects, the relations, contradictions, and agreements among the ideas all hold also among the objects; and we can see this to be the general foundation of all human knowledge. But our ideas *are* adequate representations of the tiniest parts of extended things, so no parts of the things - through whatever divisions and subdivisions we may suppose them to be arrived at - can be smaller than some ideas that we form. The plain consequence - to be drawn with no shuffling or dodging - is that whatever appears impossible and contradictory in relation to these ideas must be really impossible and contradictory ·in relation to the things·.

Everything that is capable of being infinitely divided contains an infinite number of parts; otherwise the division would be stopped short by the indivisible parts that we would arrive at. So if Ÿanything of finite size is infinitely divisible, Ÿit can't be a contradiction to suppose that an extended thing of finite size contains an infinite number of parts; and conversely, if Ÿit *is* a contradiction to suppose that a finite thing contains an infinite number of parts, Ÿno finitely extended thing can be infinitely divisible. The thesis that a finite thing can be infinitely divided is absurd, as I easily convince myself by considering my clear ideas. I first take the smallest idea I can form of a part of the extended world, and being certain that there is nothing smaller than this idea, I conclude that whatever I discover by means of *it* must be a real quality of extended things. I then repeat this idea once, twice, thrice, and so on; this repetition brings it about that my compound idea of *extension* grows larger and larger, becoming double, triple, quadruple, etc. what it was before. until eventually it swells up to a considerable size - larger or smaller depending on how often I repeat the same idea. When I stop adding parts, the idea of extension stops enlarging; and if I continued the addition in infinitum, my idea of extension - this is clear - would have to become infinite. From all this I infer that the idea of Ÿan infinite number of parts is just the idea of Ÿan infinite extension; that no finite extension can contain an infinite number of parts; and, consequently that no finite extended thing is infinitely divisible.[1]

Let me add another argument, proposed by a noted author (Monsieur Malezieu), which seems to me very strong and beautiful. It is obvious that *existence* in itself belongs only to *unity*, and is applicable to number only on the strength of the units of which the number is composed. Twenty men may be said to exist; but it is only because one, two, three, four, etc. are existent; and if you deny the existence of the individual men the existence of the twenty automatically falls. So it is utterly absurd to suppose that a number ·of items· exists and yet deny the existence of individual items. Now, according to the

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[1] It has been objected to me that infinite divisibility requires only an infinite number of *proportional* parts, ... and that an infinite number of proportional parts does not form an infinite extension. (·The objector is thinking of things like the division of a line into a half, followed by a quarter, followed by an eighth, . . . and so on·.) But this is entirely frivolous. Whether or not the parts are proportional, they can't be smaller than the minute parts I have been talking about, and so the conjunction of them can't generate a smaller extension.

common opinion of metaphysicians ·who believe that whatever is extended is divisible·, what is extended is always a number of items and never resolves itself into a unit or indivisible quantity; from which it follows that what is extended can never exist! It is no use replying that a determinate quantity of extension ***is*** a unit, though one that admits of an infinite number of fractions and can be subdivided without limit. For by that standard these twenty men can be considered as a unit. The whole planet earth, indeed the whole universe, can be considered as a unit. ***That*** kind of 'unity' involves a merely fictitious label that the mind can apply to any quantity of objects that it collects together; that sort of 'unity' can no more exist alone than number can, because really it is a true number ·masquerading under a false label· .The unity that can exist alone and whose existence is necessary to that of all number is of another kind; it must be perfectly indivisible and incapable of being resolved into any lesser unity.

All this reasoning applies also to ·the infinite divisibility of· ***time***, along with a further argument that we ought to take notice of. A property of time that it cannot lose - it is in a way time's ***essence*** - is that its parts come in ***succession***, and that no two of them, however close, can exist ***together***. Every Ÿmoment must be distinct from - later or earlier than - each other Ÿmoment, for the same reason that the Ÿyear 1737 cannot coexist with the present Ÿyear 1738. This makes it certain that time, because it exists, must be composed of indivisible moments. For if we could never arrive at an end of the division of time, and if each moment as it succeeds another were not perfectly single and indivisible, there would be an infinite number of ***coexistent moments or parts of time***, ·namely the parts of the ***moment***·; and I think this will be agreed to be an arrant contradiction.

The infinite divisibility of space implies that of time, as is evident from the nature of motion. So if time can't be infinitely divisible, space can't be either.

I am sure that even the most obstinate defender of infinite divisibility will concede that these arguments are 'difficulties', and that it is impossible to give any perfectly clear and satisfactory answer to them. Let me point out here the absurdity of this custom of trying to evade the force and evidentness of something that claims to be a demonstration [= 'a logically rigorous proof'] by calling it a 'difficulty'. It doesn't happen with demonstrations, as it does with probabilities, that ***difficulties*** crop up and one argument counterbalances another and lessens its force. If a demonstration is sound, it can't admit of an opposing difficulty; and if it is not sound it is nothing - a mere trick - and can't itself ***be*** a difficulty. It is either irresistible or without any force at all. If in a topic like our present one you talk of 'objections' and 'replies', and of 'balancing' arguments ·property and condition·, you are either accepting that human reasoning is nothing but word-play or showing that you don't have the intellectual capacity needed for such subjects. A demonstration may be difficult to understand because of the abstractedness of its subject; but it can't have difficulties that will weaken its authority once it has been understood.

It is true that mathematicians are given to saying that there are equally strong arguments on the other side of our present question, and that the doctrine of indivisible points is also open to unanswerable objections. I shall examine these arguments and objections in detail ·in sections 4 and 5·; but first I will take them all together and try to prove through a short and decisive reason that it is utterly impossible for them to have a sound basis. ·This will occupy the remainder of this section; in section 3 I shall present some further doctrine about the ideas of space and (especially) time, and sections 4-5 will address objections to this further doctrine as well as objections to my view about divisibility·.

It is an established maxim in metaphysics that

> Whatever the mind clearly conceives includes the idea of possible existence - that is, nothing that we imagine is absolutely impossible.

We can form the idea of a golden mountain, from which conclude that such a mountain could actually exist. We can form no idea of a mountain without a valley, and therefore regard it as impossible.

Now, it is certain that we have an idea of extension, for how otherwise could we talk and reason about it? It is also certain that this idea as conceived by the imagination, though divisible into parts or smaller ideas, is not *infinitely* divisible and doesn't consist of an infinite number of parts; for that would exceed the grasp of our limited capacities. So here we have it: an idea of extension consisting of parts or lesser ideas that are perfectly indivisible; so this idea implies no contradiction: so it is possible for extension reality also to be like that; so all the Ÿarguments that have been brought against the possibility of mathematical points are mere scholastic quibbles that don't deserve our attention.

We can carry this line of argument one step further, concluding that all the purported Ÿdemonstrations of the infinite divisibility of the extended are equally invalid; because it is certain that these demonstrations cannot be sound without proving the impossibility of mathematical points; which it is an evident absurdity to claim to do.

Section 3_{ii}: The other qualities of our ideas of space and time

For deciding all controversies regarding ideas, no discovery could have been more fortunate than the one I have mentioned, that

> impressions always precede ideas, and every ·simple· idea that comes into the imagination first makes its appearance in a corresponding impression.

These Ÿimpressions are all so clear and evident that they there is no argument about them, though many of our Ÿideas are so obscure that it is almost impossible even for the mind in which they occur to say exactly what they are like and how they are made up. Let us apply this principle with a view to revealing more about the nature of our ideas of space and time.

On opening my eyes and turning them to the surrounding objects, I see many visible bodies; and when I shut my eyes again and think about the distances between these bodies, I acquire the idea of extension. As every idea is derived from some impression that is exactly like it, this idea of extension ·must come from some impression, which can only be· either some sensation derived from sight or some internal impression arising from these sensations.

Our internal impressions are our passions, emotions, desires, and aversions; and I don't think anyone will say that *they* are the model from which the idea of space is derived! So there remain only the ·external· senses as sources for this original impression. Well, what impression *do* our senses here convey to us? This is the principal question, and it is decisive independently of the nature of the idea.

My view of the table in front of me is alone sufficient to give me the idea of extension. So this idea is borrowed from, and represents, some impression that appears to my senses at this moment. But my senses convey to me only the impressions of coloured points arrayed in a certain manner. If you think the eye senses anything more than that, tell me what! And if it is impossible to show ‘anything more’, we can confidently conclude that Ÿthe idea of extension is nothing but Ÿa copy of these coloured points and of the manner of their appearance.

Suppose that when we first received the idea of extension it was from an extended object - or composition of coloured points - in which all the points were of a purple colour. Then in every repetition of that idea we would not only place the points in the same order with respect to each other, but would also bestow on them that precise colour which was the only one we had encountered. But afterwards, having experience of other colours - violet, green, red, white, black, and all the different compositions of these - and finding a resemblance in the layout [Hume’s word is ‘disposition’] of coloured points of which they are composed, we omit the peculiarities of colour as far as possible, and establish an abstract idea based merely on the layout of points, the manner of appearance, which is common to them all. Indeed, even when the resemblance is carried beyond the objects of one sense, ·and the sense of *touch* comes into the story·, the impressions of touch are found to be similar to those of sight in the layout of their parts, and because of this resemblance the abstract idea can represent both. All abstract ideas are really nothing but particular ones considered in a certain light; but being attached to general terms they can represent a vast variety, and can apply to objects which are alike in some respects and vastly unalike in others.

The idea of time is derived from the succession of our perceptions of *every* kind - ideas as well as impressions, and impressions of reflection as well as of sensation. So it provides us with an instance of an abstract idea that covers a still greater variety than does the idea of space, and yet is represented in the imagination by some particular individual idea of a determinate quantity and quality.

As we receive the idea of space from the layout of visible and tangible objects, so we form the idea of time from the succession of ideas and impressions ·in our minds·. Time cannot *all on its own* make its appearance or be taken notice of by the mind. A man in a sound sleep, or strongly occupied with one thought, is unaware of time; the same duration appears longer or shorter to his imagination depending on how quickly or slowly his perceptions succeed each other. A great philosopher (Mr Locke) has remarked that our perceptions have certain limits in this respect - limits that are fixed by the basic nature and constitution of the mind - beyond which no influence of external objects on the senses can ever speed up our thought or slow it down. If you quickly whirl around a burning coal, it will present to the senses an image of a circle of fire, and there won’t seem to be any interval of time between its revolutions. That is simply because our perceptions can’t succeed each other as quickly as motion can be communicated to external objects. When we have no successive perceptions, we have no notion of time, even though there is a real succession in the objects - ·as when in a single circling of the burning coal, the second quarter of the journey follows the first quarter·. From these phenomena, as well as from many others, we can conclude that time can’t make its appearance to the mind Ÿalone or Ÿattended by a steady unchanging object, but is always revealed by some perceivable succession of changing objects.

To confirm this we can add the following argument which strikes me as perfectly decisive and convincing. It is evident that time or duration consists of different parts; for otherwise we couldn’t conceive a longer or shorter duration. It is also evident that these parts are not coexistent: for the quality of *having parts that coexist* belongs to Ÿextension, and is what distinguishes it from Ÿduration. Now as time is composed of parts that don’t coexist, an unchanging object, since it produces only coexistent impressions, produces none that can give us the idea of time; and consequently that idea must be derived from a succession of changing objects, and time in its first appearance can never be separated from such a succession.

Having found that time in its first appearance to the mind is always joined with a succession of changing objects, and that otherwise we can never be aware of it, we now have to ask whether Ÿtime can be *conceived* without our conceiving any succession of objects, and whether Ÿthere can be a distinct stand-alone idea of time in the imagination.

To know whether items that are joined in an impression are separable in ·the corresponding· idea, we need only to know whether the items are different from one another. If they are, it is obvious that they can be conceived apart: things that are different are distinguishable, and things that are distinguishable can be separated, according to the maxims I have explained. If on the contrary they are not different they are not distinguishable, in which case they can’t be separated. But this ·latter state of affairs· is precisely how things stand regarding Ÿtime in relation to Ÿsuccession in our perceptions. The idea of time is not derived from a particular impression mixed up with others and plainly distinguishable from them; its whole source is *the manner in which* impressions appear to the mind - it isn’t *one of them*. Five notes played on a flute give us the impression and idea of time, but time is not a sixth impression that presents itself to the hearing or to any other of the senses.

Nor is it a sixth impression which the mind by reflection finds in itself, ·thus yielding *time* as an idea of reflection·. To produce a new idea of reflection the mind must have some new inner impression: it can go over all its ideas of sensation a thousand times without extracting from them any *new* original idea, unless it feels some *new* original impression arise from this survey. ·And, returning now to our flute·, *these five sounds making their appearance in this particular manner* don’t start up any emotion or inner state of any kind from which the mind, observing it, might derive a new idea. All the mind does in this case is to notice *the manner* in which the different sounds make their appearance, and ·to have the thought· that it could afterwards think of it as the *manner* in which other things - ·other than the five flute-notes· - might appear. ·For the mind to have the idea of time·, it must certainly have the ideas of some objects [here = ‘events’], for without these it could never arrive at any conception of time. Time doesn’t appear as a primary distinct impression, so it has to consist in different ideas or impressions or objects disposed in a certain manner - the manner that consists in their succeeding each other.

Some people, I know, claim that the idea of duration is applicable in a proper sense to objects that are perfectly unchanging; and I think this is the common opinion of philosophers as well as of ordinary folk. To be convinced of its falsehood, however, we need only to reflect on the above thesis that

> the idea of duration is always derived from a succession of changing objects, and can never be conveyed to the mind by anything steadfast and unchanging.

It inevitably follows from this that since the idea of duration can’t be *derived from* such an object it can’t strictly and accurately be *applied to* such an object either, so that no unchanging thing can ever be said to have duration. Ideas always represent the objects or impressions from which they are derived, and it is only by a fiction that they can represent or be applied to anything else. We *do* engage in a certain fiction whereby we apply the idea of time to unchanging things and suppose that duration is a measure of rest as well as of motion. I shall discuss this fiction in section 5.

There is another very decisive argument that establishes the present doctrine about our ideas of space and time; it relies merely on the simple principle that our ideas of space and time are compounded of parts that are indivisible. This argument may be worth the examining.

Every idea that is distinguishable is also separable; so let us take *one of those simple indivisible ideas of which the compound idea of extension is formed*, separate it from all others, and consider it on its own. What are we to think are its nature and qualities?

Clearly *it* isn't the idea of extension; for the idea of extension consists of parts, and we have stipulated that the idea we are considering is perfectly simple and indivisible ·and therefore has no parts·. Is it nothing, then? That is absolutely impossible. The compound idea of extension is real, and is composed of ideas just like this one we are considering; if they were all nonentities, there would be a real existence composed of nonentities, which is absurd. So I have to ask: What *is* our idea of a simple and indivisible point? If my answer seems somewhat new, that is no wonder, because until now the question has hardly ever been thought of. We are given to arguing about the nature of mathematical points, but seldom about the nature of the ideas of points.

The idea of space is conveyed to the mind by two senses, sight and touch; nothing ever appears to us as extended unless it is either visible or tangible. The compound impression that represents *extension* consists of several smaller impressions that are indivisible to the eye or feeling, and may be called

impressions of atoms or corpuscles endowed with colour and solidity.

But this is not all. For these atoms to reveal themselves to our senses, it is not enough merely that they be coloured or tangible; we have to *preserve the idea* of their colour or tangibility, if we are to grasp them by our imagination. The idea of their colour or tangibility is *all there is* that can make them conceivable by our mind. Deprive the ideas of these sensible qualities and you annihilate them so far as thought or imagination in concerned

Now, as the parts are, so is the whole. If a point is not considered as coloured or tangible, it can't convey any idea to us, in which case there can't be an idea of extension that is composed of the ideas of these points. If the idea of extension really can exist, as we are aware it does, its parts must also exist, which requires them to be considered as coloured or tangible. So we have no idea of space or extension as anything except an object either of our sight or feeling.

The same reasoning will prove that the indivisible moments of time must be filled with some real object, some existing item, whose succession forms the duration and makes it conceivable by the mind.

Section 4_{ii}: Objections answered

My system about space and time consists of two intimately connected parts. ŸThe first depends on this chain of reasoning.

> The capacity of the mind is not infinite. So
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> no idea of extension or duration consists of an infinite number of parts or smaller ideas, but of a finite number, which are simple and indivisible. So
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> it is possible for space and time to exist conformable to this idea, i.e. as only finitely divisible. So
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> space and time actually do exist in that form, since their infinite divisibility is utterly impossible and contradictory.

ŸThe other part of my system is a consequence of this. Dividing ideas of space and time into their parts, one eventually reaches parts that are indivisible; and these indivisible parts, being nothing *in themselves*, are inconceivable unless they are *filled with* something real and existent. So the ideas of space and time are not separate or distinct ideas, but merely ideas of the manner or order in which objects exist ·or in which events occur·. This means that it is impossible to conceive either Ÿa ·spatial· vacuum, extension without matter, or Ÿ·a temporal vacuum, so to speak·, a time when there is no succession or change in any real existence. Because these parts of my system are intimately connected, I shall examine together the objections that have been brought against both of them, beginning with those against the finite divisibility of extension.

1. The objection that I shall take first really has the effect of showing that the two parts of my system depend on one another, rather than of destroying either of them. In the schools they have often argued like this:

> A mathematical point is a nonentity; so
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> no assemblage of such points can constitute a real existence; so
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> the whole system of mathematical points is absurd; ·so
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> there is no coherent account of where the division of extended things would end if it *did* end; so
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> such a division doesn't end·; so
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> anything extended must be infinitely divisible.

This would be perfectly decisive if there were no middle way between Ÿthe infinite divisibility of matter and Ÿthe nonentity of mathematical points. But there is evidently such a way, namely conferring colour or solidity on these points; and the absurdity of the two extremes is a demonstration of the truth and reality of this middle way. (The system of physical points, which is an alternative middle way, is too absurd to need a refutation. A real extension such as a physical point is supposed to be can't exist without parts that are different from each other; and when objects are different they are distinguishable and separable by the imagination, ·which means that the supposed physical point isn't a *point* after all·.)

2. The second objection to the view that extension consists of mathematical points is that this would necessitate *penetration*. A simple and indivisible atom that touches another (the argument goes) must penetrate it; for it can't touch the other only at its external parts because it, being simple, doesn't *have* parts. So one atom has to touch the other intimately, in its whole essence, [then some Latin phrases], which is the very definition of 'penetration'. But penetration is impossible; so mathematical points are impossible too.

I answer this objection by substituting a sounder idea of penetration. What we must mean when we talk of penetration is this:

> two bodies containing no empty space within them come together and unite in such a way that the body resulting from their union is no bigger than either of them.

Clearly this penetration is nothing but the annihilation of one of the bodies and the preservation of the other, without our being able to tell which is which. Before the contact we have the idea of two bodies; after it we have the idea only of one. ·This is the only way we can make sense of 'penetration', for· the mind can't possibly preserve any notion of difference between two bodies of the same nature existing in the same place at the same time.

Taking 'penetration' in this sense, now, as meaning the annihilation of one body on its contact with another, I ask: Does anyone see a necessity that a coloured or tangible point should be annihilated upon the approach of another coloured or tangible point? On the contrary, doesn't everyone see clearly that from the union of these points there results an object that is compounded and divisible and can be distinguished into two parts - each part preserving its existence, distinct and separate, despite its being right next to the other? ·If help is needed·, aid your imagination by conceiving these points to be of different colours, to help you keep them distinct. Surely a blue and a red point can lie next to one another without any penetration or annihilation. For if they can't, what can possibly become of them? Shall the red or the blue be annihilated? Or if these colours unite into one, what new colour will they produce by their union?

What chiefly gives rise to these objections, and at the same time makes it so hard to answer them satisfactorily, is the natural infirmity and unsteadiness of our imagination ***and*** our senses when employed on such tiny objects. Put a spot of ink on paper and back away to a place from which the spot is altogether invisible: you will find that as you move back towards the spot it at first Ÿbecomes intermittently visible, then Ÿbecomes continuously visible, and then Ÿacquires a new force only in ·the intensity of· its colouring, without getting any bigger; and afterwards, when it has increased enough to be really extended, it will still be hard for your imagination to break it into its component parts, because of the uneasiness you will experience in the conception of such a tiny object as a single point. This infirmity affects most of our reasonings on the present subject, and makes it almost impossible to answer intelligibly and accurately the many questions that can arise about it.

3. Many objections to the thesis of the indivisibility of the parts of extension have been drawn from mathematics, though at first sight that science seems favourable to my doctrine. Anyway, although it is contrary in its demonstrations, it perfectly agrees with me in its definitions. My present task, then, is to defend the definitions and to refute the demonstrations.

A surface is defined to be length and breadth without depth; a line to be length without breadth or depth; a point to be what has neither length, breadth, nor depth. It is evident that all this is perfectly unintelligible on any other supposition than that of the composition of extension by indivisible points or atoms. How else could anything exist without length, without breadth, or without depth?

Two different answers, I find, have been made to this argument ·of mine·, neither of them satisfactory in my opinion. ŸThe first answer is that the objects of geometry - those surfaces, lines, and points whose proportions and positions it examines - are mere ideas in the mind; they never *did* and indeed never *can* exist in nature. They never *did* exist, because no-one will claim to draw a line or make a surface that perfectly fits the definition; and they never *can* exist, because we can produce demonstrations from these very ideas to prove that they are impossible.

But can anything be imagined more absurd and contradictory than this reasoning? Whatever can be conceived by a clear and distinct idea necessarily implies the possibility of existence; and someone who claims to prove the impossibility of its existence by any argument derived from the clear idea is really saying that we have no clear idea of it because we have a clear idea! It is pointless to search for a contradiction in something that is distinctly conceived by the mind. If it implied a contradiction, it couldn't possibly be conceived.

So there is no middle way between allowing at least the possibility of indivisible points and denying that there is any idea of them. And that principle is the basis for Ÿthe second answer to the argument of mine I have been defending. It has been claimed that though it is impossible to *conceive* a length without any breadth, we can *consider* one without bringing in the other, doing this by means of an abstraction without a separation. It is in this way (they say) that we can think the length of the road between two towns while ignoring its breadth. The length is inseparable from the breadth both in Nature and in our minds; but that doesn't rule out ·our giving the length· a partial consideration, thereby making a distinction of reason.

In refuting this answer I shan't again press the argument that I have already sufficiently explained, namely that if the mind can't reach a minimum in its ideas, its capacity must be infinite in order to take in the infinite number of parts of which its idea of any extension would be composed. Instead, I'll try to find some new absurdities in this reasoning.

A surface terminates a solid; a line terminates a surface; a point terminates a line; but I contend that if the ideas of a point, line, or surface were not indivisible we couldn't possibly conceive these terminations. ·Here is how I argue for that·. Suppose that the ideas in question *are* infinitely divisible, and then let your mind try to fix itself on the idea of *the last* surface, line, or point; it will immediately find this idea to break into parts; and when your mind seizes on the last of these parts it will ·again· lose its hold because of a new division - and so on ad infinitum, with no possibility of arriving at a terminating idea. The number of fractions bring it no nearer the last division than the first idea it formed. Every particle eludes the grasp by a new fraction, like quicksilver when we try to take hold of it. But as in fact Ÿthere *must* be something that terminates the idea of any finite quantity, and as Ÿthis terminating idea can't itself consist of parts or smaller ideas (otherwise the terminating would be done not by this idea but by the last of its parts, and so on), this is a clear proof that Ÿthe ideas of surfaces don't admit of any division in depth, those of lines can't be divided in breadth or depth, and those of points can't be divided in any dimension.

The schoolmen were so well aware of the force of this argument that some of them maintained that, mixed in with Ÿparticles of matter that are infinitely divisible, Nature has a number of ·indivisible· Ÿmathematical points, so as to provide terminations for bodies; and others eluded the force of this reasoning - ·the reasoning of the preceding paragraph· - by a heap of unintelligible point-scorings and distinctions. Both these adversaries equally yield the victory: a man who hides himself admits the superiority of his enemy just as clearly as does one who fairly hands over his weapons.

Thus it appears that the Ÿdefinitions of mathematics destroy the purported Ÿdemonstrations: if we have ideas of indivisible points, lines, and surfaces that fit their definitions, their existence is certainly possible; but if we have no such ideas, it is impossible for us ever to conceive the termination of any figure, and without that conception there can be no geometrical demonstration.

But I go further, and maintain that none of these demonstrations can carry enough weight to establish such a principle as that of infinite divisibility. Why? Because when they treat of such minute objects they are built on ideas that are not exact and maxims that are not precisely true, so that they are not properly ***demonstrations***! When geometry decides anything concerning the proportions of quantity, we shouldn't expect the utmost precision and exactness - none of its proofs yield that. Geometry takes the dimensions and proportions of figures accurately - but ***roughly***, with some give and take. Its errors are never considerable, and it wouldn't it err at all if it didn't aim at such an absolute perfection.

I first ask mathematicians what they mean when they say that one line or surface is 'equal to', or 'greater than', or 'smaller than' another. This question will embarrass any mathematician, no matter which side of the divide he is on: maintaining that what is extended is made up of Ÿindivisible points or of Ÿquantities that are divisible in infinitum.

The few mathematicians who defend the hypothesis of indivisible points (if indeed there are any) have the readiest and soundest answer to my question. They need only reply that lines or surfaces are equal when the numbers of points in each are equal, and that as the proportion of the numbers varies so does the proportion of the lines and surfaces. But though this answer is sound, as well as obvious, I declare that this standard of equality is entirely useless and that it is never from *this* sort of comparison that we determine objects to be equal or unequal with respect to each other. The points that make up any line or surface, whether seen or felt, are so tiny and so jumbled together that it is utterly impossible for the mind to compute how many there are; so such a computation can't provide us with a standard by which we may judge proportions. No-one will ever be able to determine, by a precise count ·of constituent points·, that an inch has fewer points than a foot, or a foot fewer than a yard; which is why we seldom if ever consider this as the standard of equality or inequality.

As for those who imagine that extension is divisible in infinitum, they can't possibly give *this* answer to my question, or fix the equality of lines or surfaces by counting their component parts. According to their hypothesis Ÿ*every* figure - large or small - contains an infinite number of parts; and Ÿinfinite numbers, strictly speaking, can't be either equal or unequal to one another; so Ÿthe equality or inequality of any portions of space can't depend on proportions in the numbers of their parts. It can of course be said that the inequality of a mile and a kilometre consists in the different numbers of the feet of which they are composed, and that of a foot and a yard in their different numbers of inches. But the quantity we call 'an inch' in the one is supposed to be equal to what we call 'an inch' in the other, *this* equality has to be fixed somehow. ·Perhaps by sameness of numbers of millimetres·! If we are not be embark on an infinite regress, we must eventually fix some standard of equality that doesn't involve counting parts.

There are some who claim that equality is best defined by *congruence*, and that two figures are equal if when they are placed one on the other all their parts correspond to and touch each other. To evaluate this definition I must first make this preliminary point: equality is a *relation*; it isn't a property in the figures themselves, but arises merely from the comparison the mind makes between them. So if equality consists in this imaginary application and mutual contact of parts, we must at least have a clear notion of these parts, and must conceive their contact. In this conception, obviously, we would follow these parts down to the tiniest that can possibly be conceived, because the contact of *large* parts would never make the figures equal. But the tiniest parts we can conceive are mathematical points! So this standard of equality is the same as the one based on the equality of the number of points, which we have already seen to be a sound but useless. We must therefore look elsewhere for an answer to my question.

Many philosophers refuse to assign any *standard* of equality. To give us a sound notion of equality, they say, it is sufficient to present two objects that are equal. They hold that without the perception of such objects all definitions are fruitless, and when we *do* perceive such objects we don't need any definition. I entirely agree with all this. I contend that the only useful notion of equality or inequality is derived from the whole united appearance and the comparison of particular objects.

It is evident that the eye - or rather the mind - is often able at one view to compare the size of bodies, and pronounce them equal or unequal to each other without examining or comparing the numbers of their minute parts. Such judgments are not only common but in many cases certain and infallible. When the measure of a yard and that of a foot are presented, the mind can no more question that the first is longer than the second than it can doubt the most clear and self-evident principles.

So there are three proportions that the mind distinguishes in the general appearance of its objects, and labels as 'larger', 'smaller', and 'equal'. But though its decisions regarding proportions are sometimes infallible, they aren't always so; our judgments of this kind are as open to doubt and error as those on any other subject. We frequently correct our first opinion Ÿby a review and reflection, and judge objects to be equal that we at first thought unequal, or regard an object as smaller than another though it had formerly seemed to be larger. And that isn't the only way in which we correct these judgments of our senses: we often discover our error Ÿby putting the objects side by side; or, where that is impracticable, Ÿby applying some common and invariable measure ·such as a yardstick· to each, learning in that way of their different proportions. And these corrections themselves are subject to further correction, and to different degrees of exactness depending on the nature of the measuring-instrument we use and the care with which we use it.

So when the mind Ÿhas become accustomed to making these judgments and to correcting them, and Ÿhas found that when two figures appear to the eye to be equal they are also equal by our other standards, Ÿwe form a *mixed* notion of equality derived from both the looser and the stricter methods of comparison. But we are not content with this. Sound reason convinces us that there are bodies vastly smaller than those that appear to the senses (and false reason tries to convince us that there are bodies *infinitely* smaller!); so we clearly perceive that we have no instrument or technique of measurement that can guarantee us against all error and uncertainty. We are aware that the addition or removal of one of these tiny parts won't show up either in the appearance or in the measuring; and we imagine that two figures that were equal before can’t be equal after this removal or addition; so we suppose some imaginary standard of equality by which the appearances and measuring are *exactly* corrected, and the figures are related by *that* standard. This standard is plainly imaginary. For as the very idea of *equality* is the idea of

> a specific appearance, corrected by placing the things side by side or applying to each a common measure,

the notion of any correction that is finer that we have instruments and techniques to make is a mere fiction of the mind, and is useless as well as incomprehensible. Although this standard is merely imaginary, however, the fiction is very natural: the mind often continues in this way with some procedure, even after the reason that started it off has ceased to apply. This appears very conspicuously with regard to time. Obviously we have no exact method of comparing periods of time - not even ones as good as we have for parts of extension - yet the various corrections of our ·temporal· measures, and their different degrees of exactness, have given us an obscure unexpressed notion of *perfect and entire equality*. The same thing happens in many other subjects as well. A musician, finding that his ear becomes every day more delicate, and correcting himself by reflection and attention, continues with the same act of the mind - ·the same thought of progressive refinement· - even when the subject fails him ·because he is thinking of refinements that he can’t actually *make*·; and so he is led to entertain a notion of a *perfect* major third or octave, without being able to tell where his standard for that comes from. A painter creates the same fiction with regard to colours; a mechanic with regard to motion. To the former *light and shade*, to the latter *swift and slow*, are imagined to be capable of exact comparison and equality beyond the judgments of the senses.

We can apply the same reasoning to curves and straight lines. Nothing is more apparent to the senses than the difference between a curved line and a straight one, and our ideas of these are as easy to form as any ideas that we have. But however easily we may form these ideas, it is impossible to produce any definition of them that will fix the precise boundary between them. When we draw a line on paper it runs from point to point in a certain manner that determines whether the line as a whole will look curved or straight; but ·this ‘manner·, this order of the points, is perfectly unknown; all we see is the over-all appearance ·that results from it·. Thus, even on the system of indivisible points we can form only a distant notion of some unknown standard to these objects. On the system of infinite divisibility we can’t go even this far, and are left with merely the *general appearance* as the basis on which to settle whether lines are curved or straight. But though we can’t give a perfect definition of ‘curved’ or ‘straight’, or come up with any very exact method of distinguishing curved lines from straight ones, this doesn’t prevent us from correcting ·our judgment based on· the first appearance by Ÿa more accurate consideration and by Ÿapplying some standard of whose accuracy we are more sure of because of its past successes. It is from these corrections, and by carrying on the same ·correcting· action of the mind past where there is any basis for it, that we form the loose idea of *a perfect standard for straight and curved*, without being able to explain it or grasp what it is.

Mathematicians, it is true, claim to give an exact definition of a straight line when they say that *it is the shortest distance between two points*. ·I have two objections to this supposed definition·. First: this is a statement of the *properties* of a straight line, not a sound *definition* of ‘straight’. When you hear ‘a straight line’ mentioned, don’t you think immediately of Ÿa certain appearance, without necessarily giving any thought to Ÿthis property? ‘Straight line’ can be understood *on its own*, but this ‘definition’ is unintelligible without a comparison with *other* lines that we conceive to be longer. Also, in everyday life it is established as a maxim that the straightest journey is always the shortest; but if our idea of a straight line *was* just that of the shortest distance between two points, that maxim would be as absurd as ‘The shortest journey is always the shortest’!

Secondly, I repeat what I showed earlier, that we have no precise idea of equality and inequality, shorter and longer, any more than we do of straight and curved; so the former can never yield a perfect standard for the latter. An exact idea can’t be built on ideas that are loose and indeterminate.

The idea of a *plane surface* is as little susceptible of a precise standard as that of a *straight line*; we have no means of distinguishing such a surface other than its general appearance. It is useless for mathematicians to represent a plane surface as *produced by the flowing of a straight line*. This is immediately open to ·three· objections: (1) that Ÿour idea of a surface is as independent of Ÿthis way of forming a surface as Ÿour idea of an ellipse is of Ÿthe idea of a cone (·though mathematicians ‘define’ an ellipse as something made by cutting a cone in a certain way·); (2) that the idea of a straight line is no more precise than that of a plane surface; (3) that a straight line can flow irregularly and thus form a figure quite different from a plane, so that ·for purposes of the mathematicians’ definition· we must suppose the straight line to flow along two straight lines parallel to each other and *on the same plane*, which makes the definition circular.

So it seems that the ideas that are most essential to geometry - namely the ideas of

equality and inequality,
straight line, and
plane surface

- are far from being exact and determinate, according to our common method of conceiving them. We are not only incapable of *telling* in difficult particular cases whether these figures are equal, whether this line is straight, whether that surface is plane; we can’t even have a firm and invariable *idea* of equality or straightness or planeness. Our appeal is still to the weak and fallible judgment that we make from Ÿthe appearance of the objects and correct by Ÿa compass or ·other· everyday device or technique; and if we bring in the supposition of Ÿsome further correction, it will be either useless or imaginary. It is pointless to resort to the usual line of thought that brings in God, supposing that his omnipotence enables him to form a perfect geometrical figure, and draw a straight line without any curve or inflection. As the ultimate *standard* of these figures is derived from nothing but the senses and imagination, it is absurd to talk of any perfection beyond what sense and imagination can determine, because the true perfection of *anything* consists in its conformity to its *standard*.

Since these ideas are so loose and uncertain, I want to ask any mathematician:

> What entitles you to be so utterly sure of the most vulgar and obvious principles of your science (let alone of the more intricate and obscure ones)? How can you prove to me, for instance, that two straight lines can't have a segment in common? Or that it is impossible to draw more than one straight line between any two points?

If he replies that these opinions are obviously absurd, and in conflict with our clear ideas, I answer:

> I don't deny that. When two straight lines approach each other Ÿwith a perceptible angle between them, it is absurd to imagine them to have a common segment. But suppose two lines to approach at the rate of Ÿone inch in sixty miles, I see no absurdity in asserting that when they meet they become one. Please tell me what rule or standard you are going by when you assert that the line in which I have supposed them to come together can't make the same straight line as those two that form so small an angle between them? Presumably you have some idea of a straight line to which this line doesn't conform. Well, then, do you mean that the line in question doesn't take the points in the same order and by the rule that is special and essential to a straight line? In judging in this way you are allowing that extension is composed of indivisible points, which may be more than you intend; but let that pass. My present point is just that Ÿthis is *not* the standard by which we form the idea of a straight line; and that Ÿeven if it were, our senses and imagination don't provide anything firm enough to determine when such an order is violated or preserved. The original standard of a straight line is in reality nothing but *a certain general appearance*; and it is evident that straight lines can be made to coincide and yet correspond to this standard, even if it is corrected by all the means either practicable or imaginable.

Whichever way they turn, mathematicians are still caught in this dilemma. ·On one side of it·: If they judge of equality etc. by the accurate and exact standard of the enumeration of the minute indivisible parts, they Ÿemploy a standard that is useless in practice, and Ÿthey rely on the truth of something they have been trying to explode, namely the doctrine of indivisible parts of extension. ·On the other side of the dilemma·: If they employ (as they usually do) the inaccurate standard derived from the general appearance of objects when they are considered together, corrected by measuring and putting the objects side by side, their first principles are too coarse to afford any such subtle inferences as they commonly draw from them. The first principles are certain and infallible; but they are based on imagination and the senses, so what is ·soundly· inferred from them can never go beyond those faculties, much less contradict them.

This may open our eyes a little, and let us see that no geometrical 'demonstration' of the infinite divisibility of extension can have as much force as we naturally attribute to every argument supported by such magnificent claims. At the same time we may learn why it is that geometry fails to convince us on this single point, while all its other reasonings command our fullest assent and approval. And indeed there seems to be more need to explain *why* this exception exists than to show *that* it really is an exception and that all the mathematical arguments for infinite divisibility are utterly sophistical. For it is obvious that as no *idea of quantity* is infinitely divisible it is a glaring absurdity to try to prove that *quantity itself* admits of such a division, arguing for this by means of ideas that are directly opposite to that conclusion. And as this absurdity is very glaring in itself, so every argument based on it is accompanied by a new absurdity and involves an obvious contradiction.

I could cite as instances those arguments for infinite divisibility that are derived from *the point of contact* - ·that is, the *point* at which, supposedly, a circle is in contact with a straight line that is tangential to it· . I know no mathematician will agree to be judged by the diagrams he draws on paper, these being rough sketches (he will tell us) that serve only to convey more easily certain *ideas* that are the true basis of all our reasoning. I accept this, and am willing to base the controversy merely on these *ideas*. So I ask our mathematician to form as accurately as possible the ideas of a circle and a straight line; and then I ask whether in his conception of their contact he can conceive them as touching at a mathematical point, or whether instead he has to imagine them to coincide for some space. Whichever side he chooses, he runs himself into equal difficulties. ŸIf he says that in tracing these figures in his imagination he can imagine them as *touching only at a point*, he allows the possibility of the idea of a point, and thus the possibility of points. ŸIf he says that in his conception of the contact of those lines he must make them coincide ·for some tiny distance·, he is implicitly admitting the fallacy of geometrical demonstrations that are carried beyond a certain degree of minuteness; for he certainly *has* such demonstrations against a circle's coinciding ·for any distance· with a straight line. . . .

Section 5_{ii}: The same subject continued

·At the start of section 4, I pointed out that my account of space and extension has two parts. I devoted that section to the first part, namely the thesis that what is extended consists of indivisible parts. Now we come to· the second part of my system, namely that the idea of space or extension is nothing but the idea of visible or tangible points distributed in a certain order. If that is true, it follows that *we can form no idea of a vacuum, or space where there is nothing visible or tangible*. This is met by three objections that I shall examine together, because my answer to one of them is a consequence of my answer to the other two.

First, it may be said that men have disputed for centuries about a vacuum and a plenum [= 'space that is entirely full'] without being able to reach a final decision, and even today philosophers and scientists think they are free to join either side in this controversy, as their fancy leads them. But whatever basis there may be for a controversy about vacuum and plenum themselves, it may be claimed - ·and by Locke it *was* claimed· - that the very ·existence of the· dispute is decisive concerning the idea: men couldn't possibly argue for so long about a vacuum, and either oppose or defend it, without having a notion of *what* they refuted or defended.

Secondly, if this argument should be rejected, the reality or at least the possibility of *the idea of a vacuum* can be proved by the following reasoning. Every idea is possible that is a necessary and infallible consequence of ones that are possible. Now, even if we suppose the world to be at present a plenum, we can easily conceive it to be deprived of motion - this idea must be allowed as possible. It must also be allowed as possible to conceive that God in his omnipotence annihilates some portion of matter while nothing else moves. [For the rest of this paragraph Hume continues to expound (in very Humean terms) this argument for the possibility of vacuum; and to *defend* it against a certain reply (that of Descartes), in order to set it up for his own reply.] For as every idea that is distinguishable is separable by the imagination, and as every idea that is separable by the imagination may be conceived to be separately existent, it is evident that Ÿthe existence of one particle of matter no more implies Ÿthe existence of another than Ÿone body's having a square shape implies that Ÿevery body is square. This being granted, I now ask what results from the concurrence of these two possible ideas of *rest* and *annihilation* - what must we conceive to follow from Ÿthe annihilation of all the air and subtle [= 'finer than air'] matter in a room, supposing the walls to remain the same, without any motion or alteration? There are some metaphysicians - ·such as Descartes· - who answer that since Ÿmatter and Ÿextension are the same, the annihilation of one necessarily implies that of the other; so ·if there is now Ÿno matter· between the walls of the room there is now Ÿno distance ·between them either·; that is, they *touch* each other, just as my hand touches the paper I am writing on. But though this answer is very common, I defy these metaphysicians to conceive the matter according to their hypothesis, or to imagine the floor touching roof and the opposite walls touching each other *while nothing moves*! . . . . If you change the position of the roof, floor, and walls, you suppose Ÿa motion; if you conceive anything between them, you suppose Ÿa new creation. But keeping strictly to the two ideas of Ÿrest and Ÿannihilation, it is obvious that the idea resulting from them is not that of a contact of parts, but something else that is concluded to be the idea of a vacuum.

The third objection carries the matter still further, and contends not only that the idea of a vacuum is real and possible but that it is necessary and unavoidable. This assertion is based on the *motion* we observe in bodies: this, it is maintained, would be impossible and inconceivable without a vacuum into which one body must move in order to make way for another. I shan't expound this objection at length, because it principally belongs to physics, which lies outside our present sphere.

In order to answer these objections I must dig pretty deep and consider the nature and origin of various ideas, lest we argue without perfectly understanding what we are arguing about. The idea of *darkness* is obviously not a Ÿpositive one, but merely the Ÿnegation of . . . . coloured and visible objects. When a sighted man looks around him in complete darkness, he receives no perceptions except ones he shares with someone born blind; and it is certain the latter has no idea either of light or darkness. So the impression of extension without matter couldn't come from the mere removal of visible objects; the idea of *utter darkness* can never be the same as the idea of *vacuum*.

Now, suppose a man to be supported in the air and - ·without seeing or feeling anything· - softly conveyed along by some invisible power; it is obvious that this invariable motion doesn't make him aware of anything, and doesn't give him the idea of extension or indeed any other idea. Even if he moves his limbs to and fro, this can't convey to him that idea. He feels a certain sensation or impression, the parts of which are successive to each other; they may give him the idea of *time*, but certainly they are not laid out in a way that could convey the idea of *space or extension*.

So it appears that darkness and motion, Ÿin the absence of everything visible and tangible, can't give us the idea of extension without matter, i.e. of a vacuum. So now we must ask: can they convey this idea Ÿwhen mixed with something visible and tangible? . . . . If we are to know whether *sight* can convey the impression and idea of a vacuum, we must suppose that in a complete darkness there are luminous bodies presented to us, their light revealing only these bodies themselves and giving us no impression of surrounding objects. And we have to form a parallel supposition about *touch*. It won't do to suppose a perfect absence of all tangible objects: we must suppose that something is perceived by the sense of touch. then after an interval and motion of the hand or other sense-organ another tangible object is met with, then another, and so on, as often as we please. The question is: do these intervals give us the idea of extension without body?

To begin with the case of sight: it is obvious that when only two luminous bodies appear to the eye we can see whether they are conjoined or separate, and whether the distance between them in large or small; and if that distance changes, we can perceive it getting larger or smaller as the bodies move. But in this case the distance is not anything coloured or visible, so it may be thought that what we have here is a vacuum or pure extension, not only intelligible to the mind but obvious to the senses.

This is our natural and most familiar way of thinking, but if we think a little we'll learn to correct it. Notice that when there is perfect darkness in which two ·luminous· bodies present themselves, the only change that is revealed is the appearance of these two objects; all the rest continues to be, as before, a perfect negation of light and of every coloured or visible object. This is true not only of what may be said to be far away from these bodies but also of the very distance that interposes between them; for all that consists of nothing but darkness, or the negation of light - without parts, without composition, unchanging and indivisible. Now, since Ÿthis distance causes no perception different from what a blind man gets from his eyes or what is conveyed to us in the darkest night, it must have the same properties; and as Ÿblindness and darkness give us no ideas of extension, it is impossible that the dark and undistinguishable distance between two bodies can ever produce that idea.

The sole difference between an absolute darkness and the appearance of two or more visible luminous objects consists, as I said, in the objects themselves and how they affect our senses. ·Don't think that the *distances* are also perceived·. Philosophers commonly agree that all bodies' . . . . different distances from ourselves are revealed more by reason than by the senses. The only perceptions from which we can (·by reasoned inference·) judge of the distances are

- Ÿthe angles that the rays of light flowing from the objects form with each other,
- Ÿthe motion the eye has to make when it goes from looking at one object to looking at the next, and
- Ÿthe different parts of the organs that are affected by the light from each object.

But as each of these perceptions is simple and indivisible, they can never give us the idea of extension.

We can illustrate this by considering the sense of touch, and the imaginary distance or interval between tangible or solid objects. I have supposed two cases:

- Ÿa man supported in the air and moving his limbs to and fro without meeting anything tangible;
- Ÿa man who feels something tangible, leaves it, and after a movement of which he is aware feels another tangible object.

What is the difference between these two cases? No-one will hesitate to reply that it consists merely in the perceiving of those objects, and that the sensation arising from the movement is the same in both cases. Well, that sensation can’t give us an idea of extension when it isn’t accompanied by some other perception, so it can’t give us that idea when mixed with impressions of tangible objects, because that mixture does not alter the sensation.

But although motion and darkness - alone or accompanied by tangible and visible objects - don’t convey Ÿany idea of *vacuum* or *extension without matter*, they are the causes for Ÿour falsely imagining we can form such an idea. For that motion and darkness are *closely related to* a real extension, a real complex of visible and tangible objects. ·There are three components to this relation·.

First, we may observe that two visible objects appearing in the midst of utter darkness Ÿaffect the senses in the same way, Ÿform the same angle by the rays that flow from them, and Ÿmeet in the eye ·in the same way·, as if the distance between them were filled with visible objects that would give us a true idea of extension. Similarly, the sensation of motion when there is nothing tangible between two bodies is the same as when we feel a complex body whose different parts are outside one another.

Secondly, we find by experience that when Ÿtwo bodies so placed as to affect the senses in the same way as Ÿtwo others that have a certain extent of visible objects between them, the former two can come to have the same extent of visible objects between *them* without anything’s perceptibly bumping into or penetrating anything else and without any change in the angle they subtend at the eye. Similarly, when there are Ÿtwo objects of which we can’t feel both unless, between the two feelings, time elapses and there is a sensation of movement in our hand, experience shows us that Ÿthe two objects could be felt with the intervening time being filled by that same sensation of hand-movement together with impressions of solid and tangible objects. Summing up these two points: an invisible and intangible distance can be converted into a visible and tangible one without any change in the distant objects.

Thirdly, these two kinds of distance have nearly the same effects on every natural phenomenon. All qualities - heat, cold, light, attraction, etc. - diminish in proportion to the distance; and we observe little difference ·in this effect· when the distance is Ÿmarked out by compounded and perceptible objects from what it is when the distance is Ÿknown only by how the distant objects affect the senses.

So here are three relations between the distance that conveys the idea of extension and that other distance that isn’t filled with any coloured or solid object. ŸThe distant objects affect the senses in the same way, whether separated by one distance or the other; Ÿthe second species of distance is found to be capable of receiving the first; and Ÿthey both equally diminish the force of every quality.

These relations between the two kinds of distance easily explain why one has so often been taken for the other, and why we *imagine* we have an idea of extension without the idea of any object either of sight or feeling. For we can accept it as a general maxim in this science of human nature that

> whenever there is a close relation between two ideas, the mind is very apt to mistake them, and to use one in place of the other in all its discourses and reasonings.

This phenomenon occurs so often, and is so important, that I can’t forbear to stop for a moment to examine its causes. Let me say in advance that *the phenomenon* mustn’t be confused with *my account of its causes*: if you have doubts about my explanation of the phenomenon, don't let them become doubts about the phenomenon itself. *It* may be real even if my explanation of it is chimerical. Though it is complete wrong to do so, it is very *natural* for us to infer that something doesn't exist from the falsity of a purported explanation of it; and the naturalness of that error is a clear *instance* of the very principle that I am now about the explain!

When ·in section **4**$_i$· I accepted the relations of resemblance, contiguity, and causation as principles of union among ideas, doing this without looking into their causes, I was busy pressing my first maxim, that we must in the end rest contented with experience; it wasn't that I had nothing attractive and plausible to say on the subject of the causes. It would have been easy to make an imaginary dissection of the brain, and to show why on our conception of any idea the animal spirits run into all the nearby channels and rouse up the other ideas that are related to it. But though I passed up any advantage that I might have gained from this line of thought in explaining the relations of ideas, I'm afraid that I must now have recourse to it so as to account for the *mistakes* that arise from these relations.

The mind is endowed with a power of exciting any idea it pleases: whenever it despatches the spirits into the region of the brain containing a certain idea, they always arouse the idea when they run precisely into the proper channels and rummage the cell that belongs to it. But their motion is seldom direct, and naturally turns a little to one side or the other; and for this reason the animal spirits, falling into nearby channels, present other related ideas instead of the one the mind at first wanted to look at. Sometimes we aren't aware of this switch; we continue the same train of thought, make use of the related idea that is presented to us, employing it in our reasoning as if it were the one we asked for. This is the cause of many mistakes and sophisms in philosophy, as you can imagine; and it would be easy to show this, if there were any need to do so.

Of the three relations I have mentioned, resemblance is the most fertile source of error; and indeed most mistakes in reasoning owe a lot to that source. Not only are Ÿresembling ideas related together, but Ÿthe actions of the mind that we employ in considering them are so alike that we can't distinguish *them*. This fact is of great importance. Quite generally we can say that whenever the actions of the mind in forming any two ideas are the same or very alike, we are apt to confound these ideas and take the one for the other. We'll see many instances in the course of this book. But though resemblance is the relation that most easily produces a mistake in ideas, the other two - causation and contiguity - can also contribute to this. We could prove this with the examples of poets and orators, if it were thought proper (it is certainly *reasonable*) to draw arguments from that quarter in metaphysical subjects. But metaphysicians may think this to be beneath their dignity, so I shall get a proof from an observation that can be made about most of the metaphysicians' own discourses - namely that it is usual for men to use Ÿwords instead of Ÿideas, and to Ÿtalk instead of Ÿthinking in their reasonings. We use words in place of ideas because they are commonly so closely connected that the mind easily mistakes them. This also explains why we substitute the idea of a *distance that is not taken to be visible or tangible* for the idea of *extension*, which is nothing but a complex of visible or tangible points arrayed in a certain order. The relations of causation and resemblance both contribute to this mistake. As the first sort of distance is found to be convertible into the second, it is in this respect a kind of cause; and the relation of resemblance comes in through the similarity in how the two sorts of distance affect the senses and diminish other qualities.

After this chain of reasoning and explanation of my principles, I am now prepared to answer all the objections that have been offered, whether derived from metaphysics or physics. ŸThe frequent disputes about vacuum, or extension without matter, don't prove the reality of the idea on which the dispute turns; for there is nothing more common than to see men deceive themselves in this regard, especially when some close relation presents them with *another* idea which may be the occasion of their mistake.

We can make almost the same answer to Ÿthe second objection, derived from the conjunction of the ideas of rest and annihilation. When everything in the room is annihilated, and the walls don't move, the chamber must be conceived in much the same way as at present, when the air that fills the room is not an object of the senses. This annihilation leaves the eye with the fictitious distance that is revealed by the different parts of the organ that are affected, and by the degrees of light and shade; and it leaves to the sense of touch the fictitious distance that consists in a sensation of motion in the hand or other member of the body. It is no use our looking further. On whichever side we turn this subject, we shall find that these are the only impressions such an object can produce after the supposed annihilation; and I have already pointed out that impressions can give rise only to ideas that resemble them.

Since we can suppose a body to be annihilated without producing any change in its neighbours, we can easily conceive how a body might be created anew without affecting anything else. Now, the motion of a body has much the same effect as its creation: the distant bodies are no more affected in one than in the other. This suffices to satisfy our conceptual demands, and proves that there is no inconsistency in supposing such a motion. Afterwards experience comes in play to persuade us that two bodies situated in the manner described above really *can* receive ·a new· body between them, and that there is no obstacle to converting the invisible and intangible distance into one that is visible and tangible. However natural that conversion may seem, we can't be sure that it is practically possible until we have experience of it.

Thus I seem to have answered the three objections mentioned above (·on pages 32-3·), though I realize that few people will be satisfied with these answers, and most will immediately propose new objections and difficulties. It will probably be said that my reasoning is irrelevant to the real question, and that I explain only Ÿhow objects affect the senses, without trying to account for Ÿtheir real nature and operations. What I have said goes like this:

> When there is nothing visible or tangible between two bodies, we find by experience that the bodies can be placed in the same manner, with regard to the eye and hand-movement, as if they were divided by something visible and tangible. This invisible and intangible distance is also found by experience to contain a capacity of receiving body, i.e. of becoming visible and tangible.

That is the whole of my system; and nowhere in it (the complaint runs) have I tried to explain the cause that separates bodies in this way, making them able to receive others between them, without any collision or penetration.

I answer this objection by pleading guilty, and by admitting that I never intended to penetrate into the nature of bodies or explain the secret causes of their operations. This is no part of my present purpose, and anyway I am afraid that such an enterprise is beyond the reach of human understanding, and that we shall never be able to claim to know body otherwise than by the external properties that reveal themselves to the senses. As for those who try to go further: I can't approve of their ambition until I see at least one example of success in it. But at present I content myself with knowing perfectly how objects affect my senses, and knowing what experience tells me about their connections with one another. This suffices for the conduct of life, and it also suffices for my philosophy, which claims only to explain the nature and causes of our perceptions, i.e. impressions and ideas.[2]

I shall conclude this subject of extension with a paradox that the arguments I have given will easily explain. This paradox is that Ÿif you choose to give the name 'vacuum' to distance of the invisible and intangible sort - in other words, to the ability to become a visible and tangible distance - then extension and matter are the same, and yet there is a vacuum! ŸIf you choose not to give it that name, then motion is possible in a plenum without collisions running on to infinity or returning in a circle, and without penetration. But however we express ourselves, we must always admit that we have no idea of any real extension without filling it with perceptible objects and conceiving them as visible or tangible.

As for the doctrine that time is nothing but the manner in which some real objects ·or events· exist: this is open to the same objections as the similar doctrine regarding extension. If our disputing and reasoning about Ÿ·spatial· vacuum is a sufficient proof that we have the idea of it, we must for the same reason have the idea of time when nothing happens - ·that is, of Ÿtemporal vacuum· - because there is no commoner subject of dispute. But it is certain that we really ***don't*** have any such idea. For where could it come from? Does it arise from an impression of sensation or of reflection? Point the source-impression out distinctly to us, so that we can know its nature and qualities! But if you can't point out any such impression you may be certain that you are mistaken in thinking you have any such idea.

But although it is impossible to show an impression from which an idea of *time without something that changes* could be derived, we can easily point out the appearances that make us *fancy* we have that idea. We may observe that there is a continual succession of perceptions in our mind, so that the idea of time is always present to us; and when we

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[2] As long as we confine our theorizing to the sensory appearances of objects, without getting into their real natures and operations, we are safe from all difficulties and can never be embarrassed by any question. For example, if we are asked 'Is the invisible and intangible *distance* between two objects *something* or *nothing*?' we can easily answer that it is *something*, namely a property of the objects that affect the senses in such and such a way. If we are asked 'When two objects have an invisible and intangible distance between them, do they touch or not?', we can answer that this depends on the definition of 'touch'. If objects are said to touch when there is nothing perceptible placed between them, then these two objects touch. If objects are said to touch when their images affect adjoining parts of the eye, and when the hand feels both objects successively without any interposed motion, these objects do not touch. The appearances of objects to our senses are all consistent; and no difficulties can ever arise except from the obscurity of the terms we employ.

consider an unchanging object at five o'clock and then again at six Ÿwe are apt to apply our idea of time to it in the same way as if the object had been moving or altering throughout. The first and second appearances of the object, being compared with the succession of our perceptions, seem as far apart ·in time· as if the object had really altered. To this we may add, what experience shows us, Ÿthat between these appearances the object was ***capable of*** such a number of changes ·as we fictionally imagine it to have undergone·; as Ÿalso that the unchanging or rather fictitious duration has the same effect on every quality, by increasing or diminishing it, as that succession which is obvious to the senses [the words after the semi-colon are Hume's]. Because of these three relations we are apt to confound our ideas, and imagine we can form the idea of a time and duration without any change or succession.

Section 6_{ii}: The ideas of existence and of external existence

It may be a good idea, before we leave this subject, to explain the ideas of *existence* and of *external existence*, which have their difficulties as well as the ideas of space and time. This will help to prepare us for the examination of knowledge and probability, when we understand perfectly all the particular ideas that may enter into our reasoning.

Every impression or idea of every kind, in consciousness and in memory, is conceived as *existent*; and obviously the most perfect idea . . . . of *being* is derived from this consciousness. This gives rise to a splendidly clear and conclusive dilemma: that since we never remember any idea or impression without attributing existence to it, the idea of existence must either be Ÿderived from a distinct impression that is conjoined with every perception or object of our thought or be Ÿthe very same as the idea of the perception or object.

This dilemma is an obvious consequence of the principle that every idea arises from a similar impression, so there is no doubt about how we should choose between the horns of the dilemma. So far from there being any distinct impression attending every ·other· impression and every idea, I don't think there are *any* two distinct impressions that are inseparably conjoined. Though certain sensations may at one time be united, we quickly find they can be separated and can appear apart. And thus, though every impression and idea we remember is considered as existent, the idea of existence is not derived from any particular impression.

The Ÿidea of existence, then, is identical with Ÿthe idea of whatever it is that we conceive to be existent. To reflect on something Ÿsimply, and to reflect on it Ÿas existent, are exactly the same procedure. When the idea of existence is conjoined with the idea of an object, it adds nothing to it. Whatever we conceive, we conceive to be existent. Any idea we please to form is the idea of a *being*; and the idea of a being is any idea we please to form.

If you oppose this, you are obliged to point out the distinct impression from which your idea of entity [= 'existing thing'] is derived, and to prove that this impression is inseparable from every perception we believe to be existent. This, we can say without hesitation, is impossible.

My reasoning ·in section 7_{i}· about ·the so-called 'distinction of reason· - the distinction of ideas without any real difference - won't do anything for us here. That kind of distinction is based on the fact that a single simple idea may resemble several different ideas ·in different respects·. But no object can resemble a second object with respect to its existence while differing from a third in that respect, since every object that is presented ·as a candidate for comparison· must necessarily be existent.

Similar reasoning will account for the idea of *external existence*. It is a philosophical commonplace as well as a pretty obvious truth that nothing is ever really present to the mind except its perceptions - its impressions and ideas - and that external objects become known to us only through the perceptions they give rise to. To hate, to love, to think, to feel, to see - all this is just to perceive.

Now, since nothing is ever present to the mind but perceptions, and since every idea is derived from something that was previously present to the mind; it follows that we can't so much as *conceive* or *form an idea of* anything that is specifically different [= 'different in fundamental kind'] from ideas and impressions. Look outside yourself as much as you can; chase your imagination to the heavens or to the outer limits of the universe; you'll never really advance a step beyond *yourself*, and you can't conceive any kind of existent other than the perceptions that have appeared within the narrow compass ·of your mind·. This is the universe of the imagination, and we have no ideas of anything that is not produced there.

The furthest we can go towards a conception of external objects, taking them to be specifically different from our perceptions, is to form a relative idea of them without claiming to comprehend the objects themselves. Generally speaking, we ***don't*** suppose them to be specifically different; we take them to differ from our perceptions only in respect of some of their relations, connections, and durations. But of this more fully hereafter - ·in 2_{iv}·.