



**YAC** See ARTIFICIAL CHROMOSOME.

**Yagi aerial** A directional aerial array widely used for television and \*radio telescopes. It consists of one or two dipoles, a parallel reflector, and a series of closely spaced directors (0.15–0.25 wavelength apart) in front of the dipole. When used for reception this arrangement focuses the incoming signal on the dipole. For transmission, the output of the dipole is reinforced by the directors. It is named after Hidetsuga Yagi (1886–1976).

**Yang-Mills theory** See GAUGE THEORY.

**yard** The former Imperial standard unit of length. In 1963 the yard was redefined as 0.9144 metre exactly.

**Y chromosome** See SEX CHROMOSOME.

**year** The measure of time on which the calendar is based. It is the time taken for the earth to complete one orbit of the sun. The **calendar year** consists of an average of 365.25 mean solar days – three successive years of 365 days followed by one (leap) year of 366 days. The **solar year** (or **astronomical year**) is the average interval between two successive returns of the sun to the first point of Aries; it is 365.242 19 mean solar days. This is effectively the same as the **tropical year**, the interval between two successive passages of the sun through the vernal equinox. The **sidereal year** is the average period of revolution of the earth with respect to the fixed stars; it is 365.256 mean solar days. The **anomalous year** is the average interval between successive perihelions of the earth; it is 365.259 mean solar days. See also EPHEMERIS TIME.

**yeast artificial chromosome (YAC)** See ARTIFICIAL CHROMOSOME.

**yeasts** A group of unicellular fungi within the class Hemiascomycetae of the phylum \*Ascomycota. They occur as single cells or as groups or chains of cells; yeasts reproduce asexually by \*budding and sexually by producing ascospores. Yeasts of the genus \**Saccharomyces* ferment sugars and are used in

the baking and brewing industries (see BAKER'S YEAST).

**yellow body** See CORPUS LUTEUM.

**yield point** See ELASTICITY.

**yocto-** Symbol y. A prefix used in the metric system to indicate  $10^{-24}$ . For example,  $10^{-24}$  second = 1 yoctosecond (ys).

**yolk** The food stored in an egg for the use of the embryo. It can consist mainly of protein (**protein yolk**) or of phospholipids and fats (**fatty yolk**). The eggs of oviparous animals (e.g. birds) contain a relatively large yolk.

**yolk sac** One of the protective membranes surrounding the embryos of birds, reptiles, and mammals (see EXTRAEMBRYONIC MEMBRANES). The embryo derives nourishment from the yolk sac via a system of blood vessels. In birds and reptiles the yolk sac encloses the yolk; in most mammals a fluid replaces the yolk.

**yotta-** Symbol Y. A prefix used in the metric system to indicate  $10^{24}$ . For example,  $10^{24}$  metres = 1 yottametre (Ym).

**Young, Thomas** (1773–1829) British physician and physicist, who was a child prodigy and could speak 14 languages before he was 19. His early researches concerned the eye and vision, but he is best known for establishing the wave theory of \*light (1800–1804) and explaining the phenomenon of \*interference (1807).

**Young modulus of elasticity** See ELASTIC MODULUS.

**Young's slits** See INTERFERENCE.

**ytterbium** Symbol Yb. A silvery metallic element belonging to the \*lanthanoids; a.n. 70; r.a.m. 173.04; r.d. 6.965 (20°C); m.p. 819°C; b.p. 1194°C. It occurs in gadolinite, monazite, and xenotime. There are seven natural isotopes and ten artificial isotopes are known. It is used in certain steels. The element was discovered by Jean de Marignac (1817–94) in 1878.



- Information from the WebElements site

**yttrium** Symbol Y. A silvery-grey metallic element belonging to group 3 (formerly IIIA) of the periodic table; a.n. 39; r.a.m. 88.905; r.d. 4.469 (20°C); m.p. 1522°C; b.p. 3338°C. It occurs in uranium ores and in \*lanthanoid ores, from which it can be extracted by an ion exchange process. The natural isotope is yttrium-89, and there are 14 known artificial isotopes. The metal is used in superconducting alloys and in alloys for strong permanent

magnets (in both cases, with cobalt). The oxide ( $Y_2O_3$ ) is used in colour-television phosphors, neodymium-doped lasers, and microwave components. Chemically it resembles the lanthanoids, forming ionic compounds containing  $Y^{3+}$  ions. The metal is stable in air below 400°C. It was discovered in 1828 by Friedrich Wöhler.



- Information from the WebElements site