

QUADRUPLEGIC

964

QUÆRE

the speeches of these men, quadrupled their power in Parliament. 1883 *Strabur's Mercantile Circular* 8 Nov. 88a/2 The import of raw cotton... has more than quadrupled itself in two years.

2. To amount to four times as many as.
1823 *Lewis Use & Ab. Pol. Terms* xi, 92 The number of females... probably more than quadrupled that of the male workers.

3. *intr.* (for *refl.*) To grow to four times the former number, amount, or size.

1776 *ADAM SMITH W.N.* ii. ii. (1869) I. 206 The trade of Scotland has more than quadrupled since the first erection of the two public banks at Scotland. 1834 *Hr. MARTINEAU Cinnamon & Pearls* v. 97 The exports... have quadrupled since the relaxation of the monopoly. 1882 *FRONZ Eger. Journalism* xix. 145 Mr. Levy reduced the price of the paper... The circulation doubled, trebled, quadrupled.

Hence 'quadrupled *pl.* a. = QUADRUPLE a.
1607 *TOPSELL Four-f. Beasts* (1658) 99 The Harts of Brittain and Ibarne, have their reins quadrupled or fourfold. 1803 *MANSFIELD'S Suits* 465 A quadrupled salt with a single molecule of adjunct.

quadruplegic, var. **QUADRIPLEGIC** a. and **sb.**

quadruplex (kwɔ'dru:plɜ:k). [*f.* QUADRUPLE v. + -EX-] A device that makes something four times as great.

1941 *MILLMAN & SEELY Electronics* xii. 416 The circuit... can be extended from a doubler to a quadrupler by adding two tubes and two condensers. 1946 *Nature* 5 Oct. 477/1 During the years 1929-32 they developed together the voltage quadrupler steady potential generator of 600 kilovolts. 1947 L. B. YOUNG in C. G. MONTGOMERY *Technique Microwave Measurem.* vi. 368 The crystal-oscillator frequency is multiplied to 5 Mc/sec by means of a push-push quadrupler.

quadruplet ('kwɔdruplet). [*f.* QUADRUPLE + -ET-; after *triple*].

1. *pl.* Four children born at a birth.

1787 *GARTHSHORE in Phil. Trans.* LXXVII. 355 These are the only cases of quadruplets... he had ever heard of as born in Scotland. 1836 *ANDERSON TOOTH-CYCLE. Anat.* II. 73/1 A rare instance of quadruplets consisting of three boys and a girl. 1898 *Daily News* 15 Apr. 5/2 Huller ventured on the assertion... that quadruplets were born once in 20,000 cases.

2. a. Any combination of four things or parts united or working together, esp. four combined springs (Knight *Dict. Mech.* Suppl.).
1852 *De Morgan's Logic* *Life Hamilton* (1886) III. 338 We have then an harmonic quadruplet and sextuplet, and we might have octuplets, &c.

b. *Mus.* A group of four notes to be played in the time of three of the same value.

1873 H. C. BANISTER *Music* 13 Other irregularities... such as four notes for three, termed a Quadruplet. 1938 *Oxf. Companion Mus.* p. xviii *triple* Irregular rhythmic groupings (duplets, triplets, quadruplets, etc.). 1946 P. HINDEMITH *Elem. Training for Musicians* ix. 117 The names of these newly established values are: duplets, triplets, quadruplets, and so forth up to decuplets... Some of these terms are so awkward (linguistically) that they are hardly ever used.

3. A bicycle for four riders. Cf. *QUAD sb.* 3 Also attrib.

1895 *Daily News* 27 July 5/3 Professional riders on tandems, triplets, and quadruplets. 1897 *Whitaker's Alm.* 331/2 A quadruplet team covered a flying quarter in 25.2 sec.

quadruplex ('kwɔdrupleks), a. and **sb.** [a. L. *quadruplex* fourfold, *f.* QUADRUP- + *plix-*, to fold.]

A. *adj.* 1. *Electric Telegraphy.* Applied to a system by which four messages can be sent over one wire at the same time.

1878 *KNIGHT Dict. Mech.* 1842/1 *Quadruplex Telegraph.* 1879 C. FRANCIS *Sp. Telephone* p. iii. In 1874 Edison invented a quadruplex system for the simultaneous transmission of four communications over the same conductor. 1887 *LUBBOCK Pres. Addr. Brit. Assoc. in Nature* No. 618. 411 Duplex and quadruplex telegraphy, one of the most striking achievements of modern telegraphy.

2. *Engineering.* Applied to an engine in which the expansion of the steam is used four times in cylinders of increasing diameter.

1896 *Westm. Gaz.* 8 May 10/2 A steamer, fitted with five-crank quadruplex engines.

3. *Genetics.* Also *quadri-*. Of a tetraploid individual: having the dominant allele at some particular locus represented four times.

1923 [see *DUPLEX a.* 1c]. 1932 *SANSONE & PHILP Rec. Adv. Plant Genetics* v. 182 There are five possible types of zygote in the tetraploid, quadruplex SSSS, triple SSSs, duplex SSSs, simplex SSSs and nulliplex ssss. 1963 [see *NULLIPLEX a.*]

B. *sb.* A telegraphic instrument by means of which four simultaneous messages can be sent over the same wire.

Hence 'quadruplex *v.*, to make a telegraph circuit, etc. *quadruplex*. Cf. *QUAD v.*

1887 *Brit. Merc. Gaz.* 13 June 43/2 The multiplication of wires soon attracted attention to methods of duplexing and quadruplexing the circuits. 1889 *Times* (weekly ed.) 29 Mar. 5/2 If the line is already duplexed... the addition of the phonograph will quadruplex it.

quadruplicate (kwɔ'drupli:kət), a. and **sb.** [*ad.* L. *quadruplicat-us*, *pa. ppl.* of *quadruplicare* to quadruple, *f.* QUADRUPLEX; see *PREC.*]

A. *adj.* 1. Fourfold; four times repeated. *quadruplicate proportion, ratio*, the proportion

or ratio of fourth powers in relation to that of the radical quantities.

1657 *HOBBS Abstr. Geom. Wks.* 1845 VII. 378 An infinite row of Arithmetical proportionals, in proportion quadruplicate. 1794 G. ADAMS *Not. & Exp. Philos.* III. xxxi. 269 The efforts tending to destroy the adhesion of beams from their gravity only, increase in the quadruplicate ratio of their lengths. 1816 *PLAYFAIR Nat. Phil.* II. 169 The same (probability) is increased in a quadruplicate ratio, from considering the phenomena of all these four superior planets.

2. Forming four exactly corresponding copies.
1807 *PINE Sources Mississ.* III. App. (1810) 72, I have directed the formula for you to sign of four corresponding quadruplicate receipts.

B. *sb.* 1. *in quadruplicate*: In four exactly corresponding copies or transcripts.

1790 W. HASTINGS *Let. to Boswell* 2 Dec. in B.'s *Johnson an.* 1781 Of these [letters], one which was written in quadruplicate... has already been made publick. 1900 *Rules* (25 Oct.) under *Money-Land Act* vi. The order shall be signed in quadruplicate by the permanent Secretary.

fig. 1886 *KIPLING Departm. Ditties*, etc. (1899) 47 Four times Cupid's debtor I—Bankrupt in quadruplicate.

2. *pl.* Four things exactly alike; esp. four exactly corresponding copies of a document.
1853 *Sir C. S. C. Bowdler in Law Rep.* 11 Q. *Bank Div.* 342 The conveniences which merchants... believed to be afforded by the system of triplicates or quadruplicates.

quadruplicate (kwɔ'drupli:kət), *v.* [*f.* *pl.* stem of L. *quadruplicare*; see *PREC.*]

1. *trans.* To multiply by four; to make four times as many or as great; to quadruple.

1661 in *BLOUNT Glossogr.* (ed. 2). 1674 *JEAKE Arith.* (1696) 56 Or else duplicate, quadruplicate, &c. The Fraction according to the given Integer. 1694 *SALMON Bate's Dispens.* (1713) 327/2 Sometimes the Proportion is to be quadruplicated. 1861 *Cyclopedia of the Spelling Book* II. 220 Prices were "quadruplicated", the demand for places being great. 1888 G. W. CABLE in *Amer. Missionary* Apr. 90 If you knew the natural value of this work... you would quadruplicate it before the year is out.

2. To make or provide in quadruplicate; to provide four (things) exactly alike.

1879 G. MEREDITH *Scott* III. iii. 64 We... in danger of duplicating and triplicating and quadruplicating presents.

Hence *qua'druplicating* *vbl. sb.* (*Ash Suppl.* 1775).

quadruplicate (kwɔ'drupli:kətʃən), [*ad.* L. *quadruplicatiō-em*, n. of action from *quadruplicare* to make fourfold; see *PREC.*]

1. The action or process of making fourfold, of multiplying by four; also, the result of this; a thing folded four times.

1578 *BANISTER Hist. Man v.* 78 It [the vein] is admitted into the quadruplicate of Dura mater. 1611 *COTGR.*, *Quadruplicate*, a quadruplicate. 1616 in *BULLOCKAN Eng. Expos.* [Hence in *COCKERHAM, BLOUNT*, etc.] 1674 *JEAKE Arith.* (1696) 24 Quadruplicate, is to double the Duplication. 1839 *ALISON Europe* (1849-50) VII. xii. 515. 19 Twenty-eight years; the well-known period of the quadruplicate of the Sun at compound interest of five per cent.

2. *Civil and Canon Law.* A pleading on the part of the defendant, corresponding to the rebutter at common law. Cf. *QUADRUPLY sb.*

1652 W. G. T. *Cowell's Inst.* 243 After a Triplication [follows] a Quadruplicate. 1736 *AYLIFFE Paragon* 251 *Quadruplications*, which the Defendant propounds to the Plaintiffs Triplications.

quadruplicate [*f.* QUADRUPPLICATE v. + -URE.] = *prec.*, sense 1.
1891 in *Cent. Dict.*

quadruplicity (kwɔdrupli:siti) [*ad.* L. *quadruplicitas*, n. of quality *f.* *quadruplex*; see *QUADRUPLEX* and *-ITY*.] Fourfold nature; the condition of being fourfold, or of forming a set of four.

1590 *GREENE Fr. Bacon* ix. 31 The quadruplicity Of elemental essence. 1593 *NORDEN Spec. Brit.*, *Msex* i. 44 King Canutus the Dane... in regard of his quadruplicity of kingdoms, esteemed himselfe more then a man mortall.

1664 *POWER Exp. Philos.* 37 Dr. Brown... hath ranked this conceit of the eyes of a snail (and especially their quadruplicity) amongst the vulgar errors. 1825 S. T. COLERIDGE *Aids Reflect.* App. C. (1838) I. 395 The universal quadruplicity, or four elemental forms of power. 1890 J. H. STURLING *Gifford Lect.* iii. 41 The origin of the term [final causes] lies in the Aristotelian quadruplicity of causes as such.

† **quadruplicity**, *v.* *Obs. rare*-1. [*f.* L. *quadruplicatus* QUADRUPLE + -(I)FY.] = QUADRUPLE v.

1578 *BANISTER Hist. Man* vii. 99 In the hynder part of the head these Membranes are Quadruplicifed.

quadrupling ('kwɔdrupliŋ), *vbl. sb.* [*f.* QUADRUPLE v. + -ING-] The action of the vb.

1694 *Phil. Trans.* XVII. 70 The doubling, trebling, quadrupling, &c. of Rattons is performed by squaring, cubing, biquadrating, &c. of the terms. 1888 *Full Mail* G. 27 Mar. 1/1 Supplemented, say, by the quadrupling of our field artillery.

† **quadruply**, *sb.* *Sc. Law. Obs. rare*. [*ad.* obs. F. *quadruplic* (16th c. in *Littre Suppl.*); cf. *DUPLY*] = QUADRUPPLICATION 2.

1695 *St. Act Will.* III. c. 6 (1822) IX. 365/2 The Clerks writing of the Defences, Duplies, Triplices, Quadruplies, and so forth for the defender and pursuer. 1762 (*title*)

Quadruplies for... R. Graham... J. Bakie [etc.] to the triplices for P. Honey-moon [etc.], Feb. 10. 1800 [see *DUPPLY* b].

quadruply ('kwɔdrupli), *adv.* [*f.* QUADRUPLE a. + -LY-] Four times; in a fourfold degree or manner.

1726 *SWIFT Gulliver* i. vi. The innocent person is quadruply recompensed... for the danger he underwent. 1793 T. TAYLOR *Orat. Julian* p. lxxi. Thy orb quadruply intersects these worlds. 1857 *GEO. ELIOT Es.* (1884) 4 The poet's [Young's] father was quadruply clerical, being at once rector, prebendary, court chaplain, and dean.

quadrupole ('kwɔdrupəʊl), *sb.* and *a.* *Physics.* Also *quadri-*. [*ad.* Du. *quadrupol*; see QUADRUPOL-; QUADRI-, and *POLE sb.* 1] A. *sb.* a. A multipole of order *l* = 2 (cf. *MULTIPOLE sb.*). *Usu. attrib.*

1922 *Proc. Sec. Sci. K. Akad. Wetensch. Amsterdam* XXIII. 939 Assuming the molecules to act on each other as electric quadrupoles with constant quadrupole moment. Burgers has calculated the quadrupole moment of the hydrogen molecule. 1927 *Proc. Camb. Philos. Soc.* XXIII. 930 A method of calculating the probability of switches due to radiation by the quadrupole moment seems to be supplied by Dirac's recent theory of the interaction between matter and radiation. 1932 *Proc. R. Soc. A* CXXXVIII. 666 Assuming for the field of the nucleus the field of a quadrupole, instead of that of a dipole. 1987 [see *DIPOL* 1].

1987 *Sci. News* XLIII. 87 There is an electrical property of nuclei... called the quadrupole moment, which is a measure of the departure of the nucleus from a spherical to an ellipsoidal shape. 1970 G. K. WOODGATE *Elem. Atomic Struct.* iii. 50 Pure quadrupole radiation arises when two pairs of the charge distribution are oscillating like dipoles out of phase so that the dipole contribution vanishes.

b. An arrangement of four magnetic (or electric) poles, of alternate polarity, pointing at the same volume of space (used to focus beams of sub-atomic particles).

1954 *Rev. Sci. Instruments* XXV. 289/2 The introduction of the quadrupoles Q_1 and Q_2 introduces both vertical and horizontal focusing effects for a given energy. 1961 D. LUCKEY in D. M. RITSON *Technique High Energy Phys.* ix. 420 A single quadrupole can be used to obtain vertical focusing in a broad-range uniform-field spectrometer. 1969 *IEEE Trans. Nucl. Sci.* XVI. 728/2 Work on the dipole magnetic circuits as well as on cryogenic temperature iron core quadrupoles and sextupoles has continued. 1976 *McGraw-Hill Yearbk. Sci. & Technol.* 387/2 Even when dipoles or quadrupoles are to be operated at flux densities considerably above 2 T... addition of iron shields around the windings has important advantages.

B. *adj.* Having or pertaining to two pairs of magnetic (or electric) poles.

1955 *Rev. Sci. Instruments* XXVI. 220/1 A second possibility... is to use a succession of electric or magnetic quadrupole lenses. 1966 *Ann. Rev. Nucl. Sci.* X. 163 A single quadrupole magnet has a focusing action for motion in one plane (either horizontal or vertical) and a defocusing action in the other plane. However, two or more quadrupole magnets may be used to give a net focusing action in both planes. 1976 *McGraw-Hill Yearbk. Sci. & Technol.* 387/1 Usually, uniform or quadrupole fields are required over considerable distances along the beam path. 1979 *Sci. Amer.* May 64/3 The ZGS lacks the quadrupole and sextupole magnets that are employed for focusing in many other accelerators.

Hence *quadrupolar* a.

1950 *Physical Rev.* LXXIX. 698/1 A situation in which any quadrupole splitting of the nuclear resonance in a magnetic field is small compared to the magnetic resonance frequency itself. 1959 G. THOMP *Masers* ii. 28 This statement can be generalized, because the dipole moment may be electric or magnetic; or the moment may be of higher order, quadrupolar, for example. 1972 *Science* 26 May 993/3 The author directly proceeds to describe the effects due to quadrupolar and hyperfine interactions between electrons and nuclei.

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