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Polysemy in specialized lexicon from Old English to Present-Day English

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ABSTRACT

The main aim of this paper is to show the multiplicity of meanings given to the same word in specialized English lexicon from Old English to Present-Day English in order to provide the English language with linguistic economy and flexibility, thus increasing its vocabulary. The terms analysed are extracted from the OED, together with their date, author and work where they were first registered with the different meanings, and they mainly belong to Commerce, Law, Chemistry, Mathematics, Physics, Technology and Computing.

Keywords: polysemy, specialized lexicon, Old English, Middle English, Early Modern English, Modern English, Present-Day English.

Polysemy refers to the multiplicity of meanings given to the same word. As F. Katamba says, “it is possible (...) to have several closely related meanings that are realised by the same word-form. The name for this is POLYSEMY” (1994: 22). M. Görlach defines polysemy as “the split of an individual lexeme into various sememes” (1997: 129). According to N. Congost Maestre,

entendemos por polisemia el hecho de que una misma palabra pueda tener dos o más significados diferentes. La economía lingüística es la causa general y remota de la polisemia y de la homografía y es, a su vez, la polisemia la causante de la ambigüedad léxica, pero si la polisemia deriva de la propia configuración del sistema de la lengua original, el contexto mediato o inmediato suele siempre resolverla y su traducción no presenta dificultades.

(Polysemy refers to the fact that a word may have two or more different meanings. Linguistic economy is the general and remote cause of polysemy and homography and, in turn, polysemy is the cause of lexical ambiguity, but if polysemy derives from the configuration of the system of an original language, the immediate context usually resolves it and there is no difficulty in translating it) (1994: 46)

In M. T. Cabré’s words,

la polisemia es uno de los recursos más productivos que se conocen para ampliar el léxico de una lengua. En realidad, el origen de la mayoría de términos polisémicos

reside en una analogía de base entre dos conceptos, analogía que permite que la denominación de uno pase a denominar también el otro, creando así un nuevo término sobre la base de un parecido semántico parcial.

(Polysemy is one of the most well-known productive resources to increase the lexicon of a language. In fact, the origin of most polysemic terms resides in a basic analogy between two concepts, an analogy that allows the designation of a concept to designate also the other concept, thus creating a new term based on partial semantic likeness) (1993, p. 215)

A phenomenon as widespread as polysemy cannot fail to affect terminology as well, since it is produced by the trend of a language towards economy: the word terminology designates the theory of terms and the words of a speciality. Polysemy contributes to linguistic economy and gives flexibility to a language, facilitating the creation of neologisms that make it possible for the same word to denote different notions and objects in each discipline or with different general senses. According to S. Ullmann, “the existence of “polysemy” introduced (...) an element of flexibility into language. There is nothing final about a semantic change: a word may acquire a new sense, or scores of new senses, without losing its original meaning” (Hungerford et al., 1970, p. 471).

In Old English, some examples of polysemy are the nouns *ceap*, *cieping*, *craft* and *lagu* and the adjectives *craftig* and *(ge)riht*. *Ceap*, whose first meaning is ‘cattle’ (897: AElfired, *Gregory’s Pastoral Care*), acquires by association of ideas the senses of ‘purchase, sale’ (*Beowulf*), ‘goods’ (*Two of the Saxon Chronicles Parallel*) and ‘market’ (Aelfric). *Cieping* has several commercial uses: ‘marketing, trade’ (897: AElfired, *Gregory’s Pastoral Care*), ‘market place’ and ‘commodities, commercial law’ (*Old English Vocabularies*).

Craft (Present-Day English *craft*), with the first meaning of ‘strength, courage’ (893: AElfired, *Orosius*), adopts the metaphorical uses of ‘art, ability, science, talent, virtue’ (888: AElfired, *Boethius De Consolatione Philosophiae*), ‘trade, craftsmanship, profession’ (900: *The Anglo-Saxon Version of Bede’s Ecclesiastical History*), ‘work or product of art’ (1000: *The Hexameron of S. Basil*), ‘fraud, deception’ (971: *The Blickling Homilies*) and ‘machine, instrument’.

Lagu (PDE. *law*) means ‘law’ (Aelfric), ‘legal privilege’ (*The Anglo-Saxon Laws*) and ‘district governed by the same law’. The adjective *craftig* (PDE. *crafty*) has at first the meaning of ‘strong, powerful’ (893: AElfired, *Orosius*) and then

denotes 'skillful, ingenious' (971: *The Blickling Homilies*), 'learned' (1055: *Byrthferth's Handbooc*) and 'expert in art, scientific' (*Der Benedictinregele*). The adjective (*ge*)*riht* (PDE. *right*), 'straight, direct', acquires the metaphorical uses of 'fair, right, true'. To avoid ambiguity and confusion, a technical term must have only one sense, at least in every science or technology. If it belongs to several sciences or technologies, they are homonymous.

On the other hand, ellipsis may contribute to the development of polysemy. For instance, the noun *glaes* ('a substance, in its ordinary forms transparent, lustrous, hard, and brittle, produced by fusing sand with soda or potash', PDE. *glass*) is used to form compounds describing objects made of this substance, such as *eage-glaes* ('lens'. PDE. *eye-glass*) or *drincing-glaes* ('an object used for drinking'. PDE. *drinking-glass*) and, then, by ellipsis, the first element is omitted and *glaes* describes any object made of this substance. Anyway, the compound is used if there is ambiguity.

In Middle English, the application of several technical terms to different fields contributes to polysemy, as in the case of the nouns *celle*, *Iupiter*, *Mars*, *memorandum*, *Mercurie*, *tincture* and *transmutacioun*. According to M. Romano Mozo,

el cambio semántico refleja muy directamente los cambios sociales, históricos y científicos de una comunidad lingüística. Para adaptarse a estos cambios la lengua dispone principalmente de dos mecanismos: en primer lugar, puede tomar prestados los términos de otras lenguas y, en segundo lugar, puede explotar sus recursos internos añadiendo o modificando el uso y significado de las palabras que ya existen en la lengua en cuestión y eliminando aquellos términos y significados que ya no se adaptan a la nueva situación social o cultural.

(A semantic change very directly reflects the social, historical and scientific changes of a linguistic community. To be able to adapt to these changes a language has mainly two methods: first, it may borrow terms from other languages and, second, it may exploit its internal resources by adding and modifying the use and meaning of the words existing in that language and removing those terms and meanings that no longer adapt to the new social or cultural situation) (Bernárdez Sanchís et al., 2001: 393).

The noun *celle* (PDE. *cell*), which implies the idea of closed area, acquires the associated senses of 'a small apartment, room, or dwelling, a monastery or nunnery, generally of small size, a dwelling consisting of a single chamber inhabited by a

hermit or other solitary, a small private room, in Biology the ultimate element in organic structures'. *Iupiter* (PDE. *Jupiter*), from Latin "Iupiter", 'the supreme deity of the ancient Romans', is applied to 'that God' (1205: Layamon, *The Brut*), 'the largest of the planets in the solar system' (1290: *St. Michael*) and 'a name for the metal tin' in alchemy (1386: Chaucer, *Canterbury Tales*). *Mars*, 'the Roman god of war' (1374: Chaucer, *The Compleynt of Mars*), also refers to 'the fourth planet in the order of distance from the sun' (1385: *The Legend of Good Women*), but it is used as 'the name of the metal iron' in Old Chemistry (1386: Chaucer, *Canterbury Tales*).

Memorandum, whose etymological meaning is '(it is) to be remembered', is placed at the head of a note of something that is to be remembered or a record (for future reference) of something that has been done, now only legal (1433: *Rolls of Parliament*). The noun *Mercurius* (PDE. *Mercury*) denotes 'a Roman divinity, the god of eloquence and feats of skill, the protector of traders and thieves, the presider over roads, the conductor of departed souls to the Lower World, and the messenger of the gods' (1340-70: *Alexander and Dindimus*), 'the planet nearest to the sun, and the smallest of the major planets' (1386: Chaucer, *Canterbury Tales*) and 'the metal (otherwise called quicksilver), of a silver-white colour and brilliant metallic lustre' (1386: Chaucer, *Canterbury Tales*).

Tincture, 'a colouring matter, dye, pigment, a dye used as a cosmetic' (1400: *Lanfrank's Science of Chirurgie*), is specialized in alchemy to name 'a supposed spiritual principle or immaterial substance whose character or quality may be infused into material things, which are then said to be tintured; the quintessence, spirit, or soul of a thing' (1599: T. Moufet). *Transmutacioun* (PDE. *transmutation*), 'mutation, change of condition' (1380: Wyclif, *Selected Works*) or 'change of one thing into another, conversion into something different' (1398: Trevisa, *Bartholomeus De Proprietatibus Rerum*), is used in alchemy as 'the (supposed or alleged) conversion of one element or substance into another, especially of a baser metal into gold or silver' (1478: *Coventry Leet Book*).

In Early Modern English, as B. Fennell points out,

one area of significant change in the language over this period was the lexicon; this was in response to the remarkable expansion of experience resulting from colonialism and improvements in communication, both of which allowed English speakers to come into contact with ideas and phenomena that they had not

encountered before, and provided the impetus to change the vocabulary to account for these developments (2001: 147).

As N. Congost Maestre emphasizes, “existen términos técnicos que pueden ser interdisciplinarios y aparecer en diversos dominios” (there are technical terms that may be interdisciplinary and appear in several fields) (1994, p. 46). In Early Modern English, among the polysemic terms used for various fields, we find, for instance in Mathematics, the nouns *axioma*, *calculus*, *cylinder*, *helix*, *hexagon*, *parabola*, *prisme*, *radix*, *rombe*, *tetrágone* and *vertex* and the adjective *obtuse*.

Axioma (PDE. *axiom*) belongs to logic (‘a proposition, whether true or false’. 1588: Fraunce, *The Lawiers Logike*) and Mathematics (‘a self-evident proposition, requiring no formal demonstration to prove its truth, but received and assented to as soon as mentioned’. 1600: Hooker). *Calculus* is applied in Medicine as ‘a stone, a generic term for concretions occurring accidentally in the animal body’ (1619: W. Sclater, *An Exposition with Notes, upon the First Epistle to the Thessalonians*) and in Mathematics as ‘a system or method of calculation, a branch of mathematics involving or leading to calculations’ (1672: *Philosophical Transactions*).

Cylinder refers in Geometry to ‘a solid figure of which the two ends are equal and parallel circles’ (1570: Billingsley, *Euclid*), and, in Mechanics, to ‘many cylindral parts of machines’ (1571: Digges, *Pantometria*) and ‘the cylindral chamber in which the steam (or other fluid) acts upon the piston’ (1697: Papin in *Philosophical Transactions*). *Helix* acquires the specialized senses of ‘the curve formed by a straight line traced on a plane when the plane is wrapped round a cylinder’ in Geometry (1643: Sir T. Brown, *Religio Medici*), ‘a spiral ornament, a volute’ in Architecture (1563: J. Shute, *The First and Chief Groundes of Architecture*) and ‘the curved fold or prominence which forms the rim of the external ear’ in Anatomy (1693: Blancard, *Physical Dictionary*).

Hexagon denotes in Geometry ‘a plane figure having six sides and six angles’ (1570: Billingsley, *Euclid*) and in Fortification ‘a fort with six bastions’ (1669: S. Sturmy, *The Mariner’s Magazine*). *Parabola* is used in Rhetoric to designate ‘a comparison, a metaphor, a simile drawn from the present’ (1589: G. Puttenham, *The Arte of English Poesie*) and in Geometry to refer to ‘the plane curve formed by the intersection of a cone with a plane parallel to a side of the cone’ (1684: T. Baker, *Geometrical Key*).

Prisme (PDE. *prism*) is applied in Geometry to ‘a solid figure of which the two ends are similar, equal, and parallel rectilinear figures, and the sides parallelograms’ (1570: Billingsley, *Euclid*) and in Optics to ‘a transparent body of this form, usually a triangular geometrical prism, of which the refracting surfaces are at an acute angle with each other’ (1612: H. Peacham, *The Gentleman’s Exercise*). *Radix* limits its meaning to ‘a root of a number’ in Mathematics (1571: Digges, *Pantometria*), ‘an original word or form from which other words are derived’ in Philology ((1641: E. Legh) and ‘the root of a chord’ in Music (1672: *Philosophical Transactions*).

Rombe (PDE. *rhomb*) is adopted as a term of Geometry –‘a plane figure having four equal sides and the opposite angles equal’. 1578: Hakluyt, *Voyages-*, and of Natural History –‘a part, disposition of parts, of this shape’. 1578: Hakluyt, *Voyages-*. *Tetragone* (PDE. *tetragon*) belongs to Geometry –‘a figure having four angles and four sides, a quadrangle considered as one of the polygons’. 1630: Lennard, translation of *Charron’s Wisdom-*, Fortification –‘a square fort, a quadrangular building or block of buildings’. 1669: Staynred, *Fortification-* and Astrology –‘the aspect of two planets when they are 90 degrees distant from one another relatively to the earth, the square or quadrate aspect’. 1626: Bp. Andrewes, *Sermons-*.

Vertex is specialized in Geometry –‘the point opposite to the base of a (plane or solid) figure’. 1570: Dee, *Mathematical Praeface-* and in Anatomy and Zoology –‘the crown or top of the head’. 1615: Crooke, *Body Man-*. The adjective *obtuse* is applied in Geometry to ‘a plane angle which is greater than a right angle’ (1570: Billingsley, *Euclid*) and in Natural History to ‘parts or organs of animals or plants which are not sharp or pointed’ (1589: G. Puttenham, *The Arte of English Poesie*).

Physics also has technical terms belonging to some other fields, as in the case of *focus* and *tension*. *Focus* is used in plane Geometry to refer to ‘one of the points from which the distances to any point of a given curve are connected by a linear relation’ (1656: Hobbes, *Works*), in Optics as ‘the point at which rays meet after being reflected or refracted’ (1685: Boyle, *Effects of Motion*), in Acoustics as ‘the point or space towards which the sound waves converge’ (1644: Evelyn, *Diary*) and in Pathology as ‘the principal seat (in the body) of a disease, a point where its activity is manifest’ (1684: translation of *Bonet’s Mercurius Compitalitius*). The term *tension*, ‘the action of stretching or condition of being stretched’, is introduced

into Physiology and Pathology ('the condition, in any part of the body, of being stretched or strained'. 1533: Sir T. Elyot, *The Castel of Helth*) and into Physics ('a constrained condition of the particles of a body when subjected to forces acting in opposite directions away from each other' (1685: Boyle, *Effects of Motion*).

Chemistry also contains polysemic terms such as *analysis* and *regulus*. *Analysis* is applied in Chemistry to 'the resolution of a chemical compound into its proximate or ultimate elements' (1655: S. Hartlib, *The Reformed Commonwealth of Bees*), in Literature to 'the investigation of any production of the intellect' (1644: E. Huit), in Grammar to 'the ascertainment of the elements composing a sentence or any part of it' (1612: J. Brinsley, *Ludus Literarius*), in Mathematics to 'the proving of a proposition by resolving it into simpler propositions already proved or admitted' (1656: Hobbes, *Elements of Philosophy*) and in Logic to 'the tracing of things to their source, and the resolution of knowledge into its original principles, the discovery of general principles underlying concrete phenomena' (1680: Glanvill). *Regulus* denotes in Astronomy 'a bright star (a Leonis) in the constellation Leo, called also Cor Leonis' (1559: W. Cunningham, *The Cosmographical Glasse*) and in Chemistry 'the metallic form of antimony' (1594: Sir H. Plat, *The Jewell House of Art and Nature*).

The different general senses of a word may also contribute to polysemy as in the case of the nouns *dimension*, *energia*, *function*, *gravitie* and *methode* and the verb *to eradicate*. *Dimension* is applied to 'measurement' (1555: Eden, *Decades*) and 'measurable or spatial extent of any kind' (1529: More, *Dyaloge*). *Energia* (PDE. *energy*) means: 'with reference to a speech or writing, force or vigour of expression' (1581: Sidney, *The Defence of Poesie*), 'exercise of power' (1626: Bacon), 'power actively or efficiently displayed or exerted' (1665: J. Glanvill, *Scepsis Scientifica*) and 'ability or capacity to produce an effect' (1677: Sir M. Hale, *The Primitive Origination of Mankind*).

Function has the etymological sense of 'the action of performing' (1597: S. Daniel, *The First Fowre Bookes of the Civile Warres Betweene the Two Houses of Lancaster and Yorke*), apart from 'activity' (1579: Lyly, *Euphues*) and 'the special kind of activity proper to anything' (1590: Shakespeare, *Midsummer Night's Dream*) or 'the kind of action proper to a person as belonging to a particular class' (1533: Sir T. More, *The Confutation of Barnes*).

Gravytie (PDE. *gravity*) refers to ‘weight, influence, authority’ (1534: Whitinton, *Tullyes Offices*) and ‘importance, seriousness of literary productions, style, etc., of events, facts, conditions’ (1519: *A New Interlude and a Mery of the Nature of the Four Elements*). *Method* (PDE. *method*) has several senses denoting the procedure for attaining an object: ‘a special form of procedure adopted in any branch of mental activity, whether for the purpose of teaching and exposition, or for that of investigation and inquiry’ (1586: Sir E. Hoby, *Pol. Disc. Truth*) or ‘a way of doing anything, especially according to a defined and regular plan’ (1590: Shakespeare, *The Comedy of Errors*).

The noun *methode* also acquires the senses of ‘a branch of Logic or Rhetoric which teaches how to arrange thoughts and topics for investigation, exposition, or literary composition’ (1551: T. Wilson, *Logike*), ‘orderly arrangement of ideas and topics in thinking or writing’ (1559: W. Cunningham, *The Cosmographical Glasse*), ‘the order and arrangement observed in framing a particular discourse or literary composition’ (1591: Shakespeare, *Henry VI*) or ‘orderliness and regularity in doing anything’ (1611: F. Beaumont and J. Fletcher, *A King and no King*). The verb *to eradicate* admits the general senses of ‘to pull or tear up by the roots, to root out’ (1564-78: Bullein, *A Dialogue Against the Feuer Pestilence*) and ‘to remove entirely, extirpate’ (1647-8: Coyterell, *Davila’s History of France*).

In Modern English, it is true that the most frequent words of Old English belonging to common language were adopted by several technologies or sciences with new applications. As T. Nevalainen points out, “semantic change tends to increase polysemy (...) the older the word is, the more senses it is bound to have” (in Lass, ed. 1999, p. 350). In the eighteenth and nineteenth centuries, as M. Görlach emphasizes, “words had new senses added by being applied to new technical developments; the result is that words became more polysemic” (1999: 125). For instance, the nouns related to the parts of human body have become multidisciplinary and have acquired technical use. Thus, they are anthropomorphic metaphors. According to M. T. Cabré, “las partes del cuerpo humano y del cuerpo de los animales han servido de base para la formación de términos en casi todos los campos: *pata, boca, mano, brazo, codo,...*” (the parts of a human body and those of animals have formed terms in nearly all fields: *leg, mouth, hand, arm, elbow,...*) (1993, p. 216).

Arm (Old English “arm”) adopts the technical sense of ‘lever’. *Body* specializes as ‘mass; box, drawer, casing; bodywork; consistence or viscosity of a liquid;

class or shape of matter, material substance and viscosity of a fluid'. *Finger* refers to 'hand, pointer, ratchet or catch'. *Hand* appears in the compounds *handbrake*, *hand grenade*, *handgun*, *handlebar*, *handset*, etc. and denotes 'the needle of an instrument, the hand of a clock, the span measure'. We can speak about *headlamp*, *headlight*, *headphones*, *headquarters*, etc. or the technical senses of the noun *head* when referring to 'the head of a nail, the spearhead, the head of a cylinder, the bow of a ship, or the fall of water'.

Knee denotes 'square, angle, elbow'. It forms compounds such as *knee-brace*, *knee-joint*, *kneestone* and *knee-tool*. *Toe* means base-line of a dam' in Civil Engineering; 'mouth' in the railway field; 'bottom of a borehole' in perforation, and 'soldering intersection with base metal, soldering edge' in soldering. Thus, Anglo-Saxon nouns acquire figurative or transferred meanings apart from their literal meaning. For instance, the designations of several parts of our body: the *eye* of a needle, the *hand* of a clock, the *tooth* of a saw, etc. This figurative or transferred meaning is produced as a result of a poetic imaginative treatment of the language. As F. Katamba recognizes,

Figurative language is yet another source of lexical terms. Worn-out figures of speech often end up becoming conventional lexical items. We speak of 'the *legs* of tables and chairs' because *leg*, meaning 'limb', was metaphorically extended to furniture. We speak of 'the *tongue* of a shoe' by analogy to the tongue of an animal. For the same reason we speak of 'the *eye* of a needle' and 'an *ear* of corn', 'the *foot* of a mountain' and 'the *brow* of a hill'. As seen, many DEAD METAPHORS are based on body parts (1994, p. 179).

The nouns of several animals are also metaphors of this kind: *Bull* is used in electricity in the 19th c. in the compounds *bull-dog* ('fireproof material used as oven covering obtained from ash calcination and containing silica and ferric oxide'), *bull-ring* ('connection ring') and *bull-rope* ('suspension wire'). *Crane*, with the meaning of 'a machine with a long movable arm that moves heavy things by lifting them in the air' since the 14th c., forms in the 19th c. compounds such as *crane-chain* ('a chain for cranes'), *crane-derrick* ('a crane with horizontal derrick and travelling carriage'), *crane-girder* ('girder of support of crane rings') and *crane-post* ('column of a crane'). *Dog* has meant, since the 15th c., 'fastening piece, safety

piece, pawl, clamp, hook'. It is used in the compounds *dog-hook* ('hook of timber merchant'), *dog-nail* ('nail with eccentric head') and *dog-wheel* ('wheel of pawl').

Horse is adopted by Mechanics since the 19th c. in the compounds *horse-hour*, *horsepower* ('a unit of power used for measuring how powerful an engine is') and *horserating* ('capacity of transmission'). *Monkey* has been used in Mineralogy compounds since the 19th c.: for instance, in *monkey-board* ('platform of the drilling rig'), *monkey-drift* ('gallery of exploration') and *monkey-way* ('duct of ventilation'). *Pig*, 'ingot' since the 17th c., forms the 19th c. compounds *pig-lead* ('lead in ingots') and *pig-tin* ('tin in ingots').

Spider, 'a kind of candelabra' in the 19th c., is adopted in the same century in the compounds *spider-line* ('spider's web forming the reticle of several optical instruments'), *spider-template* ('foldaway mechanical template') and *spider-type fan* ('ventilator of star').

The specialization of these words does not lead them to give up their common meanings. If we check the definitions of the specialized words, we note different relationships between the main meaning and the secondary ones. According to K. Klasson, "these networks of interrelations between the polysemic word and its various referents indicate a certain degree of overlapping which complicates the dating of such semantic changes in a word" (1977, p. 179). Some words irradiate meanings, that is, one form gives rise to several senses where the new one does not completely replace the previous one.

When a noun has several senses, they probably have something in common, a similarity or analogy. For instance, in the technical uses of the noun *spider*, features such as agility, length of legs, etc., typical of this animal, come to mind in the definitions of *The Chambers 20th Century Dictionary*: 'a light high-wheeled vehicle, a frying-pan, properly one with feet, any of various spider-like radiating structures, instruments, tools, etc., a rest for a cue in billiards, an arrangement of elastic straps with hooks attached, used to fasten luggage, etc., on to the roof-rack of a car or on to a motor-bicycle, etc.' We note also how some other languages have the same or similar metaphoric uses of their lexicon. For instance, English and German interpret metaphorically the term *brake spider* (German "Bremspinne"), but French relates the device to a star ("étoile de frein").

Some polysemic mathematical terms are *apothem*, *factum*, *holomorphic*, *orthosymmetric*, *parameter*, *trapezoid* and *vector*. *Apothem*, 'in a regular polygon: the

perpendicular dropped from the centre upon one of the sides', is a term applied by Berzelius to 'the insoluble brown deposit which forms in vegetable extracts exposed to the air' (Watts, *Dictionary of Chemistry*). *Factum* means in Civil Law 'a person's act or deed; anything stated or made certain' (1848: Wharton) and 'a statement of facts, or of the points in a case or controversy; a memorial' (1773: *Gentleman's Magazine*), and in Mathematics 'the product of two or more factors multiplied together' (1748: D. Hartley, *Observations on Man*).

The adjective *holomorphic* is the same as *holohedral* or *holosymmetrical* in Crystallography, and in Mathematics refers to 'a function which is monogenic, uniform, and continuous' (1880: G. S. Carr, *Synopsis of Mathematics*). The adjective *ortho-symmetric* (PDE. *orthosymmetric*), which means 'a symmetric determinant in which all the constituents in the secondary diagonal, and likewise all those in each of the oblique rows parallel to it, are equal', is the same as *orthorhombic* ('symmetric about two, or three, axes at right angles to each other') in Crystallography (1895: Story-Maskelyne, *Crystallography*).

Parameter is a technical term belonging to several fields. It is popularized in conferring less accurate subjects mathematical accuracy, as in the case of Sociology, Politics or Economics. In Mathematics it is adopted in conic sections: 'the third proportional to any given diameter and its conjugate (or, in the parabola, to any abscissa on a given diameter and the corresponding ordinate); and in Crystallography it means 'each of the intercepts made upon the axes in a crystal by the plane which is chosen for a face of the unit or primary pyramid' (1839: W. H. Miller, *Crystallography*).

Trapezoid, 'a quadrilateral figure no two of whose sides are parallel' (1706: Phillips), means 'a bone of the wrist, the second of the distal row of the carpus: so called from its shape' in Anatomy (1831: R. Knox, *Cloquet's System of Human Anatomy*). *Vector* is used in Astronomy as 'a line supposed to be drawn from any planet moving round a center, or the focus of an ellipsis, to that center or focus' (1704: J. Harris, *Lex. Techn.*) and in Mathematics as 'a quantity having direction as well as magnitude, denoted by a line drawn from its original to its final position' (1865: Sir W. R. Hamilton, *Lectures on Quaternions*).

Some physical terms are polysemic: for instance, *cathodic*, *quadruplex* and *stratification*. The adjective *cathodic*, derived from the electrical noun *cathode*, denotes in Physiology 'proceeding from a nerve-centre' (1852: M. Hall, *Diastaltic*

Nervous System) and in Botany ‘leaves arranged on the axis spirally’ (1882: Vines, *Sach’s Text-book of Botany*). The adjective *quadruplex* refers in Electrical Telegraphy to ‘a system by which four messages can be sent over one wire at the same time’ (1875: E. H. Knight, *The Practical Dictionary of Mechanics*) and in Engineering to ‘an engine in which the expansion of the steam is used four times in cylinders of increasing diameter’ (1896: *Westminster Gazette*, 8 May).

Stratification belongs to Geology –‘the formation of strata in portions of the crust of the earth by successive deposits of sedimentary matter’ (1795: J. Hutton, *Theory of Earth*)–, Biology and Pathology –‘the thickening of a tissue by the deposition or growth of successive thin layers’ (1875: translation of *De Bary* in *The Journal of Botany*, Oct.)– and Electricity –‘the striated appearance assumed by an electric discharge passing through a highly rarefied gas’ (1856: T. R. Robinson in *Proceedings of the Royal Irish Academy*)–.

In Chemistry it is also possible to find terms applied to some other fields such as *carbone*, *chloride*, *chlorination*, *pyrogenic*, *pyrogenous*, *radicle* and *xanthic*. *Carbone* (PDE. *carbon*) acquires the specialized senses of ‘one of the non-metallic elements, very abundant in nature, occurring uncombined in three allotropic forms’ in Chemistry (1789: Priestley in *Philosophical Transactions*) and ‘a pencil of fine charcoal used in one form of the electric light’ in Electricity (1860: Faraday, *Forces of Nature, Electric Light*).

Chloride refers to ‘a simple compound of chlorine with a metal or an organic radical’ in Chemistry (1812: Sir H. Davy, *Elements of Chemical Philosophy*) and to ‘a number of bleaching and disinfecting compounds’ in the arts (1826: W. Henry, *The Elements of Experimental Chemistry*). *Chlorination* has the specialized senses of ‘combination, treatment, saturation, etc. with chlorine’ in Chemistry and ‘the process of extracting gold and silver from certain ores by means of chlorine’ in Mining (1854: J. Scoffen in *Orr’s Circle of the Sciences*).

The adjective *pyrogenic* specializes in Geology –‘igneous’ (1853: T. Ross, *Humboldt’s Travels*)–, Chemistry –‘name for a supposed peculiar acid, now identified with formic acid’ (1864-72: Watts, *A Dictionary of Chemistry*)– and Physiology and Pathology –‘having the property of producing fever’ (1877: F. T. Roberts, *A Handbook of the Theory and Practice of Medicine*)–. The adjective *pyrogenous* acquires the meanings of ‘produced by fire or heat’, ‘igneous’ in Geology and ‘applied to a substance produced by the combustion of another substance’ in Chemistry (1839: G. Roberts, *A Dictionary of Geology*).

Radicle belongs to several sciences: Botany –‘that part of the embryo of a plant which develops into the primary root’ (1671: *Philosophical Transactions*)–, Anatomy –‘one of the branching subdivisions of vein, nerves, etc. resembling a part of a root’ (1830: R. Knox, *Béclard’s Elements of General Anatomy*)–, Chemistry –‘an element or atom or a group of these, forming the base of a compound and remaining unaltered during the ordinary chemical reactions to which this is liable’ (1862: W. Miller, *Elements of Chemistry*)– and Philology –‘elementary relational part of a word’ (1870: F. A. March, *A Comparative Grammar of the Anglo-Saxon Language*)–.

The adjective *xanthic* refers to ‘certain compounds which produce substances of a yellow colour, or bodies connected with these’ in Chemistry (1817: A. Marcet, *An Essay on the Chemical History and Medical Treatment of Calculous Disorders*) and ‘De Candolle’s name for a series or class of colours in flowers, of which the type is yellow’ in Botany (1843: *Florist’s Journal*).

Technics also adopts terms belonging to some other fields such as *clinometer*, *reometer*, *sonometer*, *uniplanar* and *water-hammer*. *Clinometer* is the name of ‘an instrument for measuring the dip of mineral strata or for determining the slope of cuttings, embankments, etc., also for taking altitudes’ (1811: *The Edinburgh Review*), but it is also applied to ‘various instruments for measuring the angle of elevation of a rifle, the roll of a ship at sea and a carpenter’s tool for levelling up sills and other horizontal framing timbers’ (1864: *Daily Telegraph*, 20 Aug.). *Reometer* (PDE. *rheometer*) is ‘the instrument for measuring the force of an electric current’ (1843: Wheatstone in *Philosophical Transactions*) and ‘an instrument for measuring the force or velocity of a water-current and the blood-flow’ (1877: M. Foster, *Text-book of Physiology*).

Sonometer denotes ‘an instrument for determining the number of vibrations made by a sonorous cord’ (1808: *Edinburgh Encyclopaedia*), ‘an instrument for testing the sense of hearing, or the efficacy of treatment for deafness’ (1849: *Practical Mechanical Journal*, Sept.) and ‘a telephone attached to an apparatus for testing metals by means of an induction-coil’ (1879: *Daily News*, 31 Dec.). The adjective *uniplanar* means ‘having or characterized by coincident planes’ in Geometry (1866: Brande & Cox, *Dictionary of Science, etc.*) and ‘of motion: lying or taking place in, confined to, one plane’ in Mechanics (1882: Minchin).

Water-hammer refers to ‘an instrument used to illustrate the fact that in a vacuum liquids and solids fall at the same rate’ (1805: *Nicholson’s Journal of*

Natural Philosophy) and ‘the concussion or sound of concussion of water in a pipe when its flow is suddenly stopped, or when live stream is admitted’ (1891: *Century Dictionary*). According to M. Görlach, “lexis is subject to more rapid change than other levels of the linguistic system: whereas the rate of change is slower in the core vocabulary (...), the replacement is much faster in more peripheral areas (for example in terms for dress, technology) and in phases of intensive linguistic contacts” (1997, p. 113).

In Present-Day English, for instance in Computing terms, there are also technical terms belonging to several specialized fields with the result of producing polysemy. In F. Katamba’s words, “in practice it is rare that completely fresh words are made up. Most of the time an existing word-form is recycled to represent a new meaning” (1994, p. 174). For example, *boldfacing* belongs to Typography –‘Clarendon type’– and Computing –‘typesetting in boldface or in boldtype’–. *Carriage* is a railway term –‘a vehicle for carrying, especially a railway passenger-car’– and a technical term –‘a carrying part of a machine’–.

Carrier is a medical term –‘one who transmits disease (without suffering from it) by harbouring germs, virus, etc.’–, a nautical term –‘a passenger aircraft’– and a Computing term –‘transporter of data’ (*data carrier*)–. As S. Potter emphasizes, “polysemy generally implies one original and central meaning from which subsidiary senses radiate” (1957, p. 154). *Drive* specializes in several fields: hunting –‘beating’–, art of war –‘attack, advance’–, tennis –‘a driving stroke’–, Mechanics –‘mechanism’– and Computing –‘unit of disk’.

Exit means ‘the departure of a player from the stage’ in a theatre and ‘the last instruction of a subroutine’ in Computing. *Feeder* restricts its general meaning in several fields: Mechanics –‘that which supplies water, electricity, ore, paper, etc.’–, Geography –‘tributary’–, railways –‘branch line’– and Computing –*sheet feeder*, ‘inputter of a sheet of paper’–. *Hook* is used in fishing –‘fish hook’–, boxing –‘knock’– and Computing –‘hooking point for programs’–. *Host* means ‘guest’ in Biology and ‘mainframe computer’ in Computing. *Index* denotes ‘exponent’ in Mathematics and ‘an alphabetical register of subjects dealt with’ in Computing.

Monitor refers to ‘an apparatus for testing transmission in electrical communication’ in radio and Computing and ‘a control receiver’ in television. *Output* belongs to Electricity –‘the amount of electric current that is produced

by a power station’– and Computing –‘data in either printed or coded form after processing by a computer’–. *Panel* has some uses: artistic –‘a flat, rectangular or square piece of wood, metal, china, etc. that forms part of a larger object’–, medical –‘list of patients’– and computational –for instance, ‘a graph pad’–.

Pixel, one of the minute units which make up the picture on a cathode-ray tube, video display, etc.’- on television, in Computing means ‘point’. *Subset* is a mathematical term –‘a set contained within a larger set’–, a Computing term –‘a partial kit of characters’- and a telephone term –‘a subscriber’s telephone’–. *System* denotes ‘a set of bodily organs of like composition or concurring in function’ in Medicine, ‘a set of equipment or parts such as water pipes or electrical wiring which is used in processes such as supplying water or heat or providing electrical power’ in Electricity and ‘a device or set of devices powered by electricity, for example a hi-fi or a computer’ in Computing.

To execute is a technical term in Law –‘to carry out the instructions that are contained in a will’, ‘to kill someone as a punishment for a serious crime’- and in Computing –‘to run a program’–. *To operate* is a military term –‘for instance, when military forces operate in a particular region, they are there in order to carry out their orders, usually as part of a larger plan or campaign’-, a medical term –‘to perform some surgical act upon the body with the hand or an instrument’– and a Computer term –‘to make a computer work’–.

To paste belongs to sports –‘to give someone a beating’– and Computing –‘to insert data’–. *To preview*, which in Cinematography means ‘to see a film before it is officially shown to the public’–, in Computing means ‘to highlight’. *To remove* denotes ‘to take away’ in Mechanics, ‘to take out surgically’ in Medicine and ‘to cut off the electric current to suppress tabulation stops, to extract cards, etc.’ in Computing. As B. A. Fennell recognizes, “the lexicon is the most changed aspect of English in the PDE period. This is largely due to the development of scientific-technological vocabulary and, at the end of the twentieth century especially, the rapid progress of computer/communications technology and computer literacy” (2001, p. 175).

Polysemy is sometimes produced because computational terms have not got a first general sense that is later specialized in several fields but they come from another specialized field. The main fields that help to form computational nomenclature are Law, Mathematics, sports and games, Fine Arts, Practical Arts,

Minor Arts, and Nautical and Military Arts. Many of the technical terms belonging to these fields, apart from belonging to Computing, have been generalized. According to B. Nerlich, “at any given point in time a single word may have multiple meanings or senses. But for a speaker/hearer a word has, at any moment of speech, only one meaning or value. In discourse words have a situated, contextualized meaning, determined by the situation and the topic, by what we are talking about” (1990, p. 124).

From Law terminology we may mention, for instance, the nouns *code*, *processing*, *record* and *transfer*. *Code*, whose early sense is ‘Roman codex’ (1303: Brunne, *Handlyng Synne*), is adopted in Computing as ‘a system of words, letters, or symbols which represent sentences or other words, to ensure economy or secrecy in transmission’-. *Processing*, registered at first with the meaning of ‘legal prosecution’ (1606: Wotton, *Letters*), is used in Computing in compounds such as *data processing*, *word processing*, *interactive processing*, *batch processing* and *simultaneous processing* with the sense of ‘to perform operations’. *Record*, ‘legal act’ (1300: *Cursor Mundi*), is applied computationally as ‘a register, that is, the base element of a file’. *Transfer*, ‘transfer of a property’ (1674: *Court Books of the Royal African Co.*), is the computational term which means ‘transmission, for instance of data, *data transfer*’.

Originally mathematical terms are *constant* and *variable*. The noun *constant*, which in Mathematics denotes ‘a fixed quantity’ (1832: W. Turnbull), adopts this sense in Computing. The noun *variable*, ‘quantity or force which, throughout a mathematical calculation or investigation, is assumed to vary or be capable of varying in value’ (1816: translation of *Lacroix’s Elementary Treatise on the Differential and Integral Calculus*), is also used in Computing.

From sports and games there are computational terms such as *check*, *disk*, *headstart* and *marker*. The verb *to check* originally denotes ‘to place in check at chess: to mark with a pattern of crossing lines’ (1614: Saul, *Chessplay*) and in Computing ‘to stop or verify, control’. *Disk*, ‘the discus or quoit used in ancient Greek and Roman athletic exercises; the game played with this’ (1715-20: Pope, *Iliad*), is applied in Computing to ‘a flat circular metal plate which is used to store large amounts of information for use by a computer’. *Headstart* is used in sports –‘an advantage over other people in a competition or race’ (1911: W. James, *Some Problems of Philosophy*)– and Computing –‘beginning of head’-. *Marker*, ‘one

whose duty is to mark game' (1486: *Book of St. Albans*), denotes 'a marking character used as a warning of verification of a situation' and as 'a sign of position in a text'.

In Fine Arts, we may find the musical terms *keyboard* and *timer*, the architectural noun *column* and the pictorial noun *palette*. *Keyboard* refers to 'the set or row of keys in such musical instruments as the organ and piano' (1819: *Pantologia*), 'the set of keys in a type-writing machine' (1851: *Illustrated Catalogue of the Great Exhibition*) and 'the set of keys in a computer'. *Timer*, whose first meaning is 'a musician' (1500: Grose, *The Antiquarian Repository*), acquires the sense of 'chronometer' in Computing.

Column, 'a tall narrow structure shaped like a solid cylinder, usually made of stone and with a decorated top that can support or decorate part of a building or stand by itself as a monument' (1481: Caxton, *The Mirrour of the World*), is used in Computing as 'a set of data arranged vertically'. *Palette*, 'a flat piece of wood or plastic on which an artist mixes colours for painting' (1622: Peacham, *The Compleat Gentleman*), computationally refers to 'the range of colours available in a video terminal, which may create tens of thousands of colours'.

In Practical Arts, we may mention the mechanical term *lever* and the carpentry and building term *sprocket*. *Lever*, 'a handle or bar that is attached to a piece of machinery, and that you pull or push in order to operate the machinery' (1648: Wilkins, *Mathematical Magick*), is used with the same meaning in Computing in compounds such as *drive selection lever*, *paper load lever*, *paper thickness lever* and *tractor unit lever*. *Sprocket*, 'a triangular piece of timber used in framing, especially one fastened on the foot of a rafter in order to raise the level of the eaves' (1536: *MS. Acc. of St. John's Hospital*), is transferred to Computing as 'a wheel with one or more rows of teeth that fit into the holes in a chain, reel of film or tape, etc. in order to turn it'.

From Minor Arts are the textile terms *spooler* and *tailor*, the photographic noun *printout*, *phototypesetting* from printing and *subbeading* from Typography. *Spooler*, 'one engaged in winding thread on spools' (1554: *Mary III*), in Computing denotes 'a program of the operating system in charge of the integration function'. The verb *to tailor*, 'to make clothes' (1662: Petty, *Taxes*), is applied in Computing to 'make a device suitable for a particular purpose'.

Printout, ‘photographic printing’ (1899: P. N. Hasluck, *Book of Photography*), is computationally referred to ‘the printed information given out by a computer, etc.’. *Phototypesetting*, ‘photocomposition’ (1931: *A. S. M. E. News*, 7 Apr.), preserves this meaning in Computing. *Subbeading*, ‘a heading to a piece of writing, which is less important than another heading’, and which divides the writing into shorter sections’ (1874: *Catalogue of the Apprentices’ Library*), adopts this meaning in Computing.

Finally, some terms such as *anchor*, *cartridge*, *navigation*, *navigational* and *port* belong to navigation and the art of war. The verb *to anchor*, ‘to secure (the ship) with an anchor; to place at, or bring to, anchor’ (1578: T. N., translation of *Conquest of the West Indies*), is used in Computing as ‘to fasten’ or ‘to stop or rest’. *Cartridge*, ‘the case in which the exact charge of powder for fire-arms is made up’ (1579: Digges, *Stratiticos*), adopts the computational sense of ‘a type of medium –generally magnetic– of data storage with the property of being extracted and replaced by another’. It can be a *disk cartridge* or a *tape cartridge*.

Navigation, ‘the action of navigating; the action or practice of passing on water, especially the sea, in ships or other vessels’ (1533: Elyot, *The Castel of Helth*) and ‘the art or science of directing the movements of ships on the sea’ (1559: W. Cunningham, *The Cosmographical Glasse*), refers in Computing to ‘an exploration: the selective search of information in a database’. Its respective adjective, *navigational* (‘pertaining to navigation’. 1884: Knight, *A Practical Dictionary of Mechanics, Supplement*), is also used in Computing.

Port, ‘a place by the shore where ships may run in for shelter from storms, or to load and unload: a harbour, a haven’ (893: AElfred, *Orosius*), is used in Computing with the sense of ‘access route’. As B. A. Fennell emphasizes, “not surprisingly, the majority of words (...) are related to computing, reflecting the rapid pace of technological advancement and application of computing to daily life” (2001, p. 177). According to B. Nerlich, “polysemy is central to the evolution of language, in so far as it manifests clearly the application of an old form to designate a new idea, thereby enriching language and thought” (1990, p. 124). As M. Romano Mozo points out, “la polisemia no es más que el reflejo sincrónico del cambio semántico diacrónico” (polysemy is only the synchronic reflection of diachronic semantic change) (Bernárdez Sanchís et al 2001, p. 397).

Conclusions

In conclusion, the terms analysed in this paper are polysemic. In the supplements of the *OED* a few new terms are included, most addenda are words previously introduced into the English language that acquire new senses. Polysemy is to be expected because lexis is finite, whereas the number of objects is infinite, and the concepts serving to classify them are often vague. It is therefore compatible with designation and linguistic economy that lexemes are used to express various contexts which are seen as related. This split of meaning, which is often based on deliberate or unconscious transfer (metaphor), can be illustrated by the anthropomorphic extensions of meaning in various European languages including English, as we have discussed when referring to Modern English words.

The lexicon of a language must be polysemic for cognitive and functional reasons, that is, reasons of communicative and cognitive economy and efficiency. A language requires ways to adapt to the constantly changed needs of speakers and their environment in order to add, modify or eliminate uses, meanings and elements. The flexible character of the lexicon is the reason why linguistic change is quicker and more obvious at this grammatical level than at others, precisely because semantic change does not produce drastic structural splits that take more time to be assimilated by the linguistic system and its speakers.

Polysemy is an indicator of progress because it enriches language and thought by applying old forms to designate new ideas. It also makes it clear that meaning is not subordinate to form, but that meaning is indeed the real force in language evolution. Polysemy is one of the most productive resources used to increase the lexicon of the English language, as we have seen since Old English, and this widespread phenomenon cannot fail to be true of terminology, as seen since Early Modern English. In fact, the origin of most polysemic terms resides in an analogy between two concepts. Logically, “the older the word is, the more senses it is bound to have” (Nevalainen, in Lass, Ed. 1999, p. 350). As we mentioned above, some words irradiate meanings, that is, one form gives rise to several senses where the new one does not completely replace the previous one.

Some words with a first general meaning then acquire specialized meanings –for instance, in Old English– and some words are technical in origin and are later applied to some other fields, especially since Middle English, and this

characteristic is very frequent in Present-Day English in Computing terminology, as we have discussed in detail in referring to the lexicon belonging initially to Law, Mathematics, sports and games, Fine Arts, Practical Arts, Minor Arts, and Nautical and Military Arts. The rapid advance of technology and science is now the main reason for rapid semantic change in English specialized lexicon.

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