

BELLARIA XXIX



DERIVATIONS (2)

The next few Bellaria will range far and wide over words whose roots lie in Latin and Greek, and were taken into English.

Education

It is often said that 'education' derives from *êdûcô*, 'I lead out', because it 'leads out' our young into a wider world. But *êdûcô* is third conjugation, and its 4th principal part is *êductum*. In fact, 'education' derives from *êducô* (short 'u'), 4th p.p. *êducâtum*, meaning 'tend, support the growth of, nurture, rear', of animals and plants, as well as humans.



Education

Selection

Debates about selective education do not go away, and ‘select’ is full of interest. It all goes back to *legô*, 4th p.p. *lectum*. Its basic meaning is ‘I gather, pick, pluck’, and gets its common meaning ‘I read’ because the reader *picks out* the letters to make a word.

Our ‘select’ derives from *sêligô*, 4th p.p. *sêlectum*, a combination of the prefix *sê* ‘apart’ + *ligô* (note *e* becomes *i*), i.e. ‘I pick out (and put) apart’, used primarily of weeds! E.g. Ennius: ‘When he found oat and darnel among the wheat, he *picked it out*, separated it off and carried it away’, an image from gardening. So that’s what selective education is all about—getting rid of unwanted weeds (and, presumably, wets).



Selective education

Pupils

Ah, pupils! *Pupa* means ‘doll’ and in the diminutive forms *pupillus* and *pupilla* were used of a minor, under the care of a guardian. When Nero fell hopelessly in love with Poppaea but refused to divorce his wife Octavia because his mother Agrippina objected, Poppaea rounded on him, calling him a ‘*pupillus*, dependent on someone else’s orders, in control neither of your empire nor your freedom!’ (Agrippina did rather have that effect on people.) One can see how the word came to be used of the young in schools.

Incidentally, *pupa* came to be spelled *puppa* in everyday ('vulgar') Latin, and is the source of our 'puppet' and the endearment 'poppet'.

But what has this got to do with the pupils of your eye? This is, of course, the black hole in the middle of the eye, through which light passes to hit the retina, enabling you to see. Evidently it is so called because when you look into someone else's eye you can see there a *diminutive* version of yourself or, in the case of James Bond, a villain creeping up behind to bean you.

Pliny the Elder commented that when a man lets go of a bird, it will usually make straight for his eyes because it sees there an image of itself which it knows and wants to reach.



Watch the birdie

Discipline

Another word for 'pupil' is *discipulus*, from *disco* 'I learn', cf. 'disciple' and *disciplina*, which like our 'discipline' ranges from a 'subject of study' to 'orderly conduct'. In the ancient world discipline in that sense often meant physical punishment. But in the modern world, we take a gentler approach: we like to inculcate e.g. good learning habits. Actually, *inculco* 4th p.p. *inculcatum* meant 'I trample down on, tread in (with the heel)', hence 'impress on someone's mind'. It derives from *calx*, 'a heel, a kicking': Ouch.



Real teaching

This sporting (educational) life

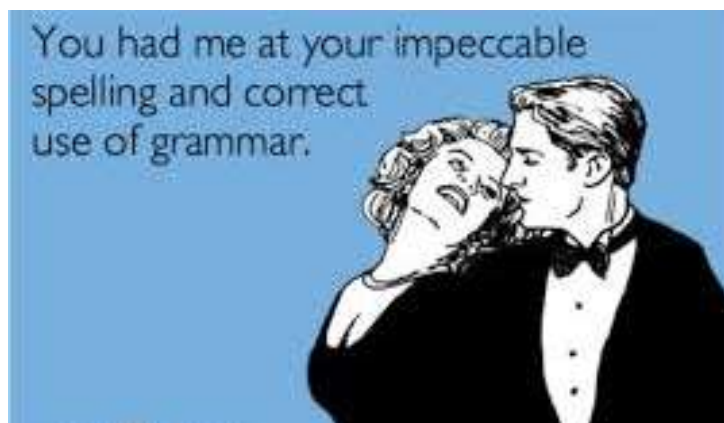
Curro means 'I run' and provides significant educational terms: 'course', from *cursus*, 'a run, progress, development, career'; *curriculum* 'a running, race, race-track, chariot', but metaphorically 'course of action, way of behaving', with *vitae* 'the life-course you have run so far'. Chariot races were of course run in the *circus*, a circular or oval place where games were held. School as circus?



Latin class

The beauty of grammar

Not many pupils would think of grammar as an alluring subject, but words have always been felt to hold some mysterious, even bewitching, occult power. The result was that the Scottish word 'gramarye', derived from 'grammar', meant 'magic, enchantment' and then 'magical beauty'. The so-called 'liquid' letters 'r' and 'l' are often interchanged, and 'gramarye' over time evolved into 'glamer' and finally our 'glamour'.



Glamour boy and girl

Grade...

comes from Latin *gradus*, 'step', 'pace', 'rung' (of a ladder) and so 'a degree of relationship', 'position, rank', 'a degree of comparative quality'. The word derives from 'I step, walk', *gradior* 4th p.p. *gressus*—, producing *progredior* 4th p.p. *progressus* and with different prefixes e.g. congress, regress, digress, ingress, egress, etc.

Numbers' game

Latin numbers are fairly common, but Greek comes into its own with the really big ones: when bytes are in the millions, they are *mega* (Greek *megas*, 'big'), in the billions *giga-* (*gigas* 'giant') and in the trillions *tera-* (*teras*, 'monster'). (Apparently byte is an intentional misspelling of 'bite' to distinguish it clearly from 'bit', a binary digit of value 0 or 1 on a computer. 'Bits' are usually formed into groups of eight to form a 'byte'.)



A petabyte swallowing a terabyte swallowing a gigabyte

Note: *Peta* is apparently 'derived' from πέντε (*pente*), meaning 'five', minus the 'n'. It denotes the fifth power of 1000 (1000⁵).

Computing

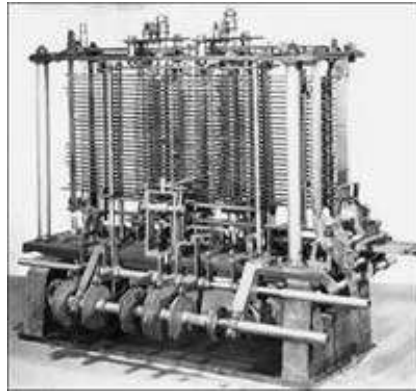
Which leads seamlessly on to computers. *Computo*, 4th p.p. *computatum* means 'I calculate, reckon up'. Its root word *puto* 'I think' is basically another gardening image: it means 'I prune, make clean, tidy up'; then 'purify' of gold, and also of financial 'accounts'—'tidying them up', resulting in 'assessing' them.

Thinking, then, is a form of 'tidying up', 'assessing' what goes on in the brain. The prefix *con-* often expresses 'completeness'—hence *computo*, thinking right through something to a conclusion, and so 'I reckon up'.

Digital Stone Age

Pliny the Younger mentioned a court case he conducted about a contested inheritance, and said at one stage he had to do some calculating (*computo*), and 'practically demanded pebbles and a board' (*calculos et tabulam*) to do it. He also talked of a man 'moving his lips, twiddling his fingers ...' as he does his sums (*computat*). Nothing new about the digital world, then (*digitus*, 'finger').

That word *calculus*, 'stone, pebble', give us 'calculate', of course. The Greek for 'pebble' was *psêphos*, with which jurors voted guilt or innocence, whence psephology—an attempt to give a *logos* (Greek 'word, account', 'reckoning', from Greek *legô* 'I gather, pick, say') of people's voting habits.



Iron Age computer

PIE

That's odd: why are Latin *legō* and Greek *legō* so similar in form and meaning? It is *not* because one derives from the other. It is because they both have a *common* linguistic ancestor—Proto-Indo-European, or PIE, as it is called. This is the name given to the *one* language from which the Latin, Greek, German and Sanskrit languages can all be proved to have descended. Linguists reconstruct the PIE form as *leg-e/o 'collect' (* denotes a non-existent reconstructed form)

Molecules

Hereby hangs a tale. Atomism was invented by Democritus and Leucippus in the 5th C BC. Greeks up till then had faced a serious problem. If the world was basically made up of one stuff—which they apparently believed, for reasons that are unclear—how come the world appeared to be made up of thousands of obviously different stuffs? How could one stuff change into them all? Atomic theory explained that the one stuff was an *atomos*: below the level of perception, it could not be split, filled the universe, and formed all of the world's different substances by differing forms of aggregation and combination.

This theory did not catch on, largely because Aristotle rejected it: he clung to the old Greek theory that the world consisted of variations on the themes of earth, air, fire and water (he added aether), which held sway until the 17th C. That was when a manuscript of the Roman poet Lucretius (1st C BC) was discovered. It contained his extraordinary six-book poem *On the Nature of the Universe*, till then wholly forgotten. In it, he 'proved' that everything about the human and natural world could be explained by atomism. It was seized upon by scientists convinced that Aristotle was wrong—and atomic particle theory was founded.

In 1678 this new particle theory spawned the term *molecula*, ‘molecule’. It was derived from the Latin *môlês* which meant ‘a vast, gigantic, monstrous mass’ (giving us our ‘mole’, a huge breakwater to hold back the sea). The *-cula* ending, however, is a diminutive. So *molecula* means ‘a small vast, gigantic, monstrous mass’. Naturally, no Roman would ever have envisaged such an idiotic word. It was used to describe what atoms congregated into.

Quantums

Quantus means ‘of what size? How many? How great?’, and gives us ‘quantity’ etc. It also gives us *quantum*. This is almost universally taken to mean ‘big, huge’, as in ‘a quantum leap’. In fact, it means precisely the reverse. Quantum physics studies *quanta* (pl.), the universe’s matter and energy at its minutest, most fundamental level, where the laws of physics are very different.

The image shows handwritten mathematical derivations and diagrams related to quantum mechanics. It includes:

- Equations for wave functions: $\langle \psi_n | \psi_n \rangle = \langle \psi_n | \int dx |x\rangle \langle x| \psi_n \rangle$, $\langle \psi_n | \psi_n \rangle = \int dx \psi_n^*(x) \psi_n(x)$, and $\langle \psi_n | \psi_m \rangle = \int dx e^{-ikx} e^{ikx}$.
- Equations for energy levels: $E_n = \frac{\hbar^2 k^2}{2m} = \frac{\hbar^2 (\frac{n\pi}{L})^2}{2m}$, $E_n = \frac{\hbar^2}{2m} \frac{\pi^2}{L^2} (2n-1)^2$, and $E_n = \frac{\hbar^2}{2m} \frac{\pi^2}{L^2} n^2$.
- A graph showing a probability distribution $|\psi_n(x)|^2$ versus position x , with a peak at $x = L/2$.
- Equations for the Hamiltonian: $\hat{H} \psi_n = -\frac{\hbar^2}{2m} \frac{d^2}{dx^2} \psi_n + V(x) \psi_n = E_n \psi_n$.
- Equations for the wave function: $\psi_n(x) = \sqrt{\frac{2}{L}} \sin(\frac{n\pi x}{L})$.
- Equations for the probability density: $|\psi_n(x)|^2 = \frac{2}{L} \sin^2(\frac{n\pi x}{L})$.
- Equations for the expectation value of position: $\langle x \rangle = \int dx x |\psi_n(x)|^2$.

Spot the mistake

Quotations

Classical Latin had many *quot-* words, asking questions about number, proportion, etc. (e.g. *quotiens*, our ‘quotient’). As a result, one might guess there was a Latin word *quoto*, 4th p.p. *quotatum*. There was, but it is medieval, not classical, Latin. *Quoto* derived from *quotus* ‘What position in a series?’, and meant ‘I distinguish by numbers’. From the 16th C it was used to mean ‘I mark with numbers in the margin’ and so ‘I cite, refer to’.

The sense of quote as ‘give us price for something’ (i.e. ‘give us a “how much?”’) is a 19th C invention, vaguely (but inaccurately) connected to *quot-* based words.

Sceptics

Today, scepticism about our political decision-making is all the rage, because everyone except the government knows exactly how to handle the corona virus, and demonstrates it by refusing to do anything the government suggests, with what results we can see all around us.

But this is not what scepticism was originally all about. It was invented as a philosophy by the Greek thinker Pyrrho (360-270 BC). Since he wrote nothing himself, we depend on later sources, but broadly he believed that 'suspension of judgment is the only justified attitude with respect to any proposition' (including that proposition). The aim was to help people live at peace with themselves and not spend all their time worrying about right and wrong courses of action.

And the Latin for sceptic? *Pyrrhoneus*, a follower of Pyrrho. There is no Latin word *scepticus*. The word, in fact, derives from *skeptikos*, Greek for someone who is thoughtful and reflective. Its verb form is *skeptomai* 'I look about carefully, examine, consider' implying 'without coming to a conclusion'. Not many sceptics about today. *Everyone* (apart from the government) knows best.



I can't believe it's Tuesday *already*

Philosophy in Latin

While we are on the subject of philosophy, there is a good reason why Greeks were the philosophers: they invented the subject and the language. It was Cicero who took the Greek and latinised it, providing us with a range of Latin options.

In some cases, the Greek word was simply written in Latin, e.g. *philosophia* from φιλοσοφία. But some words created problems. Cicero debated how to translate Greek *sôphrosunê* (σωφροσύνη), 'moderation, self-control' as follows:

'Sometimes I call it *temperantia*, sometimes *moderatio*, sometimes also *modestia*. But I do not know whether this virtue could better be termed *frugalitas*...'



I think I prefer *mediocritas*

Some philosophical terms

As a result of Cicero's and others' efforts, the following technical terms came from Greek via Latin into English:

Greek *êthikos* (ἠθικός), 'to do with ethics' >*moralis*, 'morals';

Greek *philanthrôpia* (φιλανθρωπία), 'love of mankind' >*humanitas*, 'humanity';

Greek *epistêmê* (ἐπιστήμη) 'knowledge' >*scientia*, 'science';

Greek *hormê* (ὁρμή) 'energy, impulse' >*appetitus* (animi), 'appetite';

Greek *ousia* (οὐσία) 'unchanging reality' >*essentia*, 'essence';

Greek *poiotês* (ποιότης) 'what-sort-of-ness' >*qualitas*, 'quality';

Greek *idiôma* (ιδίωμα) 'special character, unique feature' >*proprietas*, 'property' in a philosophical sense ('what is the property of electricity?').

Terminology

'Terminology' is the -logy, Greek *logos*, 'a rational account of' a *terminus*. What on earth does 'terminology' have to do with King's Cross station? *OLD* is no help on this urgent matter.

Here I admit to consulting higher authority—the *Spectator's* Dot Wordsworth. She, unlike myself, has access to the full *OED*, whose entry she emailed. This sent me off to Liddell and Scott under ὄρος (*hóros*), 'boundary, landmark'. Lo, under ὄρος IV we find Aristotle using it to mean (a) 'term of a proposition', and (b) 'definition'; and *OED* goes on to say that the Roman philosopher Boethius (6th C AD) translated ὄρος by the word *terminus*.

So 'terminology' means 'giving a rational account of terms/definitions', from which 'term' was spun off in the 16th C. Note that word 'definitions' (Latin *definitio*)—all about *fines*, 'boundaries, limits'.



End of the journey



Classics for All

This is an extract selected for you as part of Classics for All's 'Bellaria' series to cheer us up during the COVID-19 pandemic. The full series of weekly instalments may be found on our website classicsforall.org.uk/bellaria/

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