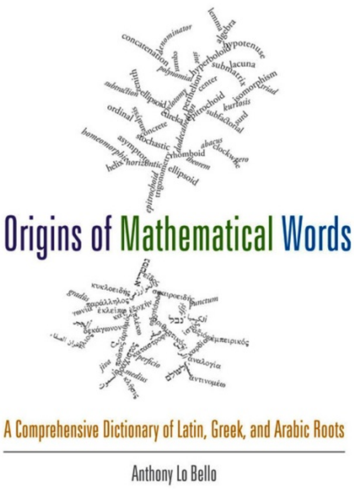
Origins of Mathematical Words

A Comprehensive Dictionary of Latin, Greek and Arabic Roots

Anthony lo Bello

(Professor of Mathematics, Allegheny College)

The John Hopkins University Press, 2013



All mathematicians are, or at least should be, concerned with the precise meaning(s) of mathematical words (and symbols) and almost every mathematician we know exhibits at least a passing interest in their etymology; their derivation, when and where they originated, perhaps by whom they were first coined, and their subsequent evolution in usage and meaning. If you entertain such curiosity, then this book is almost surely for you.

As one of us (JMB) knows first-hand, writing a dictionary [1] or like book [3] is a daunting task: be it highly successful [4] or less so [2].

After a somewhat provocative preface, the book settles into a dictionary style format, with entries largely restricted to those mathematical terms with a root(s) traceable to one of the three languages listed in the subtitle: Greek, Latin or Arabic. In many, but not all, cases entries offer a precise mathematical definition together with details of the terms etymology; its origin, perhaps when and by whom it was first coined, and something of its subsequent evolution. However, first and foremost it is what the subtitle proclaims: "a comprehensive dictionary [giving the derivation of amenable words from] Latin, Greek and Arabic roots", thus typical entries are:

> "**entire** This adjective came into English from the Latin *integer*, which means *whole*, through the mediation of the French *entier."*
>
> "**pseudosphere** This modern word is correctly compounded of the prefix ψενδο-, *false*, and the noun σφαϊρα, *a sphere*. The *pseudospere* is the surface of revolution produced by revolving a tractrix about its asymptote. It acquired the name because it is a surface of constant *negative* curvature."

It is also a book with a mission; wherever possible to eschew the use of Dr Johnson's *low* words (concoctions that are "frequently acronyms or *macaronic* concatenations, the infallible sign of defective education [from the preface]). Examples being:

> "**CW complex** The use of letters to name mathematical objects is to be deplored. If the letters ever had a meaning, they are forgotten in the next generation."

We do observe that pre-emptive naming has a fine tradition. Banach called his complete normed linear spaces “B-spaces” and Fréchet called his metric extensions “F-spaces”. They just begged to end up called after their inventors. Nonetheless we have opted to have no BS-spaces in our joint corpus.

> "**nonagon** This is an absurd word used by the unlearned for *enneagon, q.v.* It is the same sort of concoction as *septagon, q.v."*

> "By their unnatural ugliness and comical pomposity, such words betray themselves to the reader, be his intelligence ever so limited" [from the preface].

The author, however, grudgingly concedes that "immemorial custom" condones the use of certain low words; two examples being *unequal*, and

> **binomial** The prefix *bi-* is a Latin abbreviation of the adverb *bis*, *twice*. It should therefore be prefixed only to Latin words or words of Latin origin. The Greek noun νόμος means *rule* or *law*. Some claim that the word is legitimate because the second component is from the Latin *nomen*, *name*, with the adjectival ending *-alis* added, but this is unlikely, for then how does one explain the absence of the second *n*? What happened was that the Latin adjectival ending *-alis* was illiterately appended to the Greek noun, and the word became legitimate through its adoption by Newton, from whose authority there is no appeal.

This image comes from a Kindle screen capture and gives a fine flavour of the volume. When such an exception might be acceptable is largely left for the reader to decide. The current reviewers take an even less prescriptive approach to mathematical nomenclature; better an ugly universal term than competing elegant synonyms.

Thinly peppered throughout one encounters small lapses in proof reading and cross checking, as the entry for *nonagon* betrays; the cited entry for *enneagon* is nowhere to be found. However, this should not come as a surprise, when [1] was made into software (see, http://www.mathresource.com) nearly twenty years ago, the process uncovered more than 50 such dangling links (despite many seemingly careful readings by all involved in the original project).

Sadly the publishing industry has not yet mastered the "new" technology. *Were this book* available online as a single file it would be an informative and valuable resource. (Actually, it has a *Kindle* version, and is also available as a large set of alphabetic and other files in *Project Muse* http://muse.jhu.edu/books/9781421410999 for which you may have institutional access.)

There is, nonetheless, also a place for it on the shelf of a research mathematician and especially anyone teaching higher mathematics; certainly it is a must for any university/mathematics library.

References

[1.] E.J. Borowski and J.M. Borwein, *Dictionary of Mathematics*, 675 and xiv pp. (Collins, Glasgow, 1989. Second revised edition (12th printing), 631 and ix pp, 2002.

[2.] J.M. Borwein*, The SIAM 100 Digits Challenge,* Extended review for the *Mathematical Intelligencer*, **27** (4) (2005), 40-48.

[3.] J.M. Borwein*, The Oxford Users' Guide to Mathematics,* Featured *SIAM REVIEW*, **48**:3 (2006), 585-594.

[4.] J.M. Borwein*, The Princeton Companion to Mathematics*, Featured *SIAM REVIEW*, Nov. (2009) 790-794.

Jonathan M. Borwein and Brailey Sims
Newcastle, April 2, 2014.