



Origins of Mathematical Words

A Review by Andrew I. Dale

Origins of Mathematical Words: A Comprehensive Dictionary of Latin, Greek, and Arabic Roots

Anthony Lo Bello

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There are many reasons for picking up a dictionary beyond finding information, such as the meaning and derivation of a word. For example, *Brewer's Dictionary of Phrase and Fable* provides esoterica like the names and dates of the kings and queens of England, while Ambrose

Bierce's *Devil's Dictionary* supplies amusement and wit. In addition to the once useful task of removing a ganglion cyst by a smack with a heavy tome, a dictionary in the hand, as opposed to one accessed via a computer, tablet, or cell phone, has the benefit that one hardly ever finds the word one wants straight

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away. This exposes one to the pleasure of finding other words that in themselves may well be interesting. To a greater or lesser degree the *Origins of Mathematical Words* (OMW) contains information, esoterica, and humour.

"This is a book about words, mathematical words, how they are made and how they are used," Lo Bello writes in the preface. While most entries in the OMW are comparatively short, some—such as *Archimedes*, *cant*, *Descartes*, *Euclid*, [teaching] *evaluation* (an excellent discussion),

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Timaeus—are almost short essays. It is a book one may read and not just consult.

I found here many words that I had not come across before and some that I suspect have almost disappeared from modern mathematical usage, though Lo Bello says, "I have written this dictionary to describe the current vocabulary of our subject." While he cites certain words in mathematics that were introduced by the Arabs and that have survived, there are of course terms that were introduced but have not survived. As examples of the latter Lo Bello mentions some words introduced by Boëthius, such as *cæthimata* (postulates) and *oxygonium* (acute-angled). I would mention the nineteenth-century mathematician Augustus de Morgan, who used the almost completely forgotten words *comminuent*, *invelopment*, *generata*, and *generatrix*, though the latter has survived to some degree in geometry.

Lo Bello not only gives the Latin, Greek, and Arabic derivations and formations of mathematical words but also, when he finds terms to be erroneous, suggests formations that would be correct. For example, *concentric* has a Latin beginning and a Greek ending; more correct would be the Greek *syncentric* or the Latin *concentral*. He also writes that Cantor's "use of Hebrew letters was a bad idea, as one can scarcely expect people to write legibly in their own language, let alone in Hebrew."

The passage (and the preservation) of mathematics is traced first from the Greeks to the Romans, then to the Arabs, and then back to Rome. An advantage that Lo Bello has wisely passed on to his reader is that the origins of Greek and Arabic words are given here in the original alphabets, thus eliminating any queries about transliteration. Indeed, while extolling some arguments in favour of transliterations, Lo Bello also writes, "They are also employed when the translator is intellectually limited and does not understand what he is translating."

Mathematics itself enjoys a long essay in the OMW, and its derivation from the Greek μάθημα—meaning learning, knowledge, or study—is noted. However, Lo Bello's aim is

not restricted to the bull's eye of the mathematical target, for he writes:

I have sat in judgment on the correctness of the words I explain, and I have used my license to be discursive to discuss not only the function of mathematics in liberal education but also English usage among mathematicians and their colleagues in the learned world.

He disapproves of words like “pro-active” and even “neuroscience,” and in connection with English grammar he writes:

Usages such as unnecessarily splitting infinitives or using politically correct terminology become established practices that it is considered old-fashioned or offensive to criticize.

And:

Rules of grammar in the literary world are like protocol in the social world; protocol keeps in their place people who do not know their place.

Three of my personal pet aversions are the use of *their* as a singular pronoun (also discussed by Lo Bello); *facilitator* (pure cant, in Lo Bello's opinion); and *icon*, with the implication that the person to whom it is applied is worthy of veneration. However, we must accept neither the *Oxford English Dictionary* nor Merriam-Webster as the final arbiter on matters of language: there is in fact a long article in the OMW on American spelling and Noah Webster's “crimes.” Lo Bello himself writes, “The fact that a word appears in the *Oxford English Dictionary* does not imply that it is a good word... The sanction of existence can only be imparted to a word through its use by a polished author.”

English dictionaries are often partly prescriptive and partly descriptive: that is, they note how words *should* be used and also how they *are* used. Lo Bello himself is not always among the prescriptive rather than the descriptive dictionarists. For example, in his entry *Euclidean* he notes that “To write *euclidean* with a small e is not a practice of the best authors and is therefore not correct.” The difficulty, of course, is deciding who are the best authors. Lo Bello notes “the precariousness of forming new words according to rules from foreign languages without reference to the usage of the first class of writers.” Leibniz is viewed as a suitable authority, at least on the use of *analysis situs*, a phrase with a Greek nominative and a Latin genitive—or am I missing an irony? (Perhaps not, since Lo Bello writes, “Levity is unbecoming to mathematics.”) And the use of *binomial* is sanctioned by Newton, though Lo Bello considers *multinomial* and *polynomial* to be “low.”

When it comes to modern words of the twentieth and twenty-first centuries, Lo Bello says, “Such compositions are frequently acronyms or macaronic concatenations, the infallible sign of defective education.”

In a similar vein one must guard against the attaching of “ness” to adverbs rather than adjectives. Thus for in-

stance *goodness* is good, but *wellness* sits ill, despite the growth of its use. Is there a cure for the proliferation of such monstrosities? “The only solution,” declares Lo Bello, “is education,” an opinion he follows up with a discussion of the purposes, both positive and negative, of education.

The careful writer in English can make good use of Fowler's *Modern English Usage*, but one must take note that the latest edition of this incomparable work, from 2004, has at least one entry that may well have a deleterious impact on mathematical writing, namely, the entry for *parameter*:

A mathematical term of some complexity which, in the course of the 20c., has become perceived by the general public as having the broad meaning “a constant element or factor, esp. serving as a limit or boundary.”

So *parameter* means the same thing as *perimeter*? I have also noted with dismay the use made currently of words like *quantile* and *percentile* to denote areas under a curve rather than points on an axis, though the former usage is sanctioned by the OED.

Should we care a fig for general public perceptions of such technical terms? One might fight against the wrong use, but once sufficient leverage is gained, correct usage is viewed at best as an amusing idiosyncrasy. And no matter how loath one might be to accept this, with the passage of time and human perversity words acquire new meanings and become “good” English. I am sure there are many words that I am all too ready to use that were regarded as completely unacceptable a century ago.

Lectures in mathematics and statistics are, I believe, enhanced, at least for the good student, by the mention of the historical development of results and terminology, and the OMW will be of great use in this. Sad to say many of the corrections Lo Bello suggests will be ignored: I cannot, for instance, see statisticians opting for

kyrtosis rather than *kurtosis* or for ceasing to say *regress x on y* (although *regress* should be used intransitively) any more than I can see educationists eschewing *numeracy*. Nevertheless, I can heartily recommend the OMW for all who like to know what they are writing or talking about.

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ABOUT THE REVIEWER

Andrew Dale studied at the University of Cape Town and the Virginia Polytechnic Institute and State University. He spent some forty years lecturing at the University of Natal (later the University of KwaZulu-Natal) and has a keen interest in the history of statistics and probability.



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