The Old Intelligencer

Eponymy in Mathematical Nomenclature: What's in a Name, and What Should Be?*

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In any mathematics journal there may be found language such as that in the following abstract, which bears the title "A Boleslawskian Criterion for the Hughes-Williams Evaluation of non-Walquistness":

Let S be the standard Smith class of normalized univalent Matcuzinski functions on the unit disc, and let B be the subclass of normalized WaIquist functions. We establish a simple criterion for the non-Walquistness of a Matcuzinski function. With this technique it is easy to exhibit, using standard Hughes-Williams methods, a class of non-Walquist polynomials. This answers the Kopfschmerzhaus-type problem, posed by R. J. W. ("Wally") Jones, concerning the smallest degree of a non-Walquist polynomial.

Make no mistake: what we have here is not mere caricature. Although slightly embellished and utilizing imaginary surnames, it is nonetheless typical of much mathematical writing in its untrammelled use of the names of persons to identify ideas, techniques, theorems, and the like. This practice we shall call *eponymy,* from "eponym – [the name of] a person, real or legendary, from whom a theory, idea or object takes or is reputed to take its name."

In non-mathematical, or non-technical, writing and speech many eponymous words have achieved through the slow accretion of popular acceptance over many years or centuries, a permanent and rightful place in the language. Thus it would be mere tomfoolery to quarrel with such words as sandwich, cardigan, sadism, shrapnel, or silhouette, all of which are taken from the names of persons and are thereby eponymous. Indeed, even in mathematics there are a few eponyms which are time-honoured and universally accepted; witness Boolean algebra, Cartesian coordinates, or Abelian group. Yet, while the place of such words in mathematical discourse is beyond question, what is *not* beyond question is the widespread practice, as in our introductory example, of recklessly coining and using new eponymous terms, without consideration either to possible alternatives or to likely consequences.

In other scientific disciplines eponymy has long occasioned impassioned controversy. More than a century ago Charles Darwin objected to eponymous terms in biology. Writing to Hugh Strickland, composer of the first *Code of Rules for Zoological Nomenctature,* Darwin expressed his "fixed opinion"…"that the plan of a first describer's name, being appended for perpetuity to a species, has been the greatest curse to Natural History." Darwin's objections are twofold. First, eponymy is "a direct premium to hasty work"; more important, using eponymous terms means "naming instead of describing." This second objection – that eponyms merely *name*, or label, and do not *describe*, the object or idea in question – continued to be the rallying cry of those who objected to the use of eponymy as a means of coining new scientific words. Throughout the biological and medical sciences the general movement has been towards the elimination and discouragement of eponymous terms, particularly through the adoption of standard *codes* of nomenclature.

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It is ironic then that mathematicians, long accustomed to granting to their discipline the place of primogeniture within the scientific family, should have failed to give serious critical consideration to the problem of eponymy. Yet such is the case. Not only does mathematics lack a standard *code* of nomenclature but, judging from the ubiquity and the proliferation of eponymous terms in present-day mathematical nomenclature, one could easily conclude that eponymy is itself a rule of the trade. How else is one to explain the ready assent the ear gives to our introductory example, which contains, within the space of eighty-five words, no less than six eponymous terms, used twelve times?

The most important reason for mathematicians to avoid eponymy, particularly the coining of *new* eponymous words, is to be found in Darwin's distinction between naming and describing. Eponyms are in themselves meaningless, for they possess no descriptive content. They never describe; they often obscure. What, for example, do the terms "Kolmogorov variable", "Guthrie-de Morgan conjecture", or "Dirichlet principle" reveal about the nature of the variable, conjecture, or principle at hand? The corresponding non-eponymous or descriptive terms – "random variable", "four-colour conjecture", and "pigeonhole principle" – on the other hand, are in themselves suggestive and indicative of the things under consideration, and thus possess both heuristic and mnemonic value. As the ideas referred to become even more obscure, eponyms become less acceptable, description more essential. Examples abound: consider Brianchon point, Schläfli double-six, Turan number, or even our own Walquist function. (Challenged to find any intrinsic descriptive content in terms such as these, could one be blamed for confusing a Schläfli double-six with a twelve-pack of Schlitz?) In brief, eponymous terms are an ineffective and inefficient means of conveying meaning in mathematical discourse.

Moreover, the connection, mentioned by Darwin, between eponymy and "bad work" applies also to mathematics. This connection is manifest in two ways. First, reckless strings of eponymous terms will often mask shallow or trivial mathematical work. Lacking descriptive value, eponyms nonetheless provide an illusion of depth and profundity to a piece of mathematical writing. Eponyms suggest poor expository skills at best, muddled thinking at worst. Next, the granting of eponymous designations to trivial or transitory ideas may encourage further work where none is warranted, since eponyms have an uncanny knack of associating importance with any statement or idea. Eponymous terms which are trivial or unimportant draw undeserved significance from those which are time-honoured and universally accepted: Walquist polynomials bask in the glory of Hilbert spaces.

Though it may be argued that eponymous terms serve to confer historical recognition upon great practitioners of a science, in fact eponyms are often imprecise indications of historical justice. (Who among us can predict the mathematical immortality of Walquist, Hughes-Williarns, or R. J. W. ("Wally") Jones?)

The case against eponymy, then, is straightforward. Eponymous terms name rather than describe and are thus in themselves meaningless, serving to mystify rather than clarify. The use of eponymous terms is both symptomatic of shoddy work and conducive to trivial work.

What Can be Done?

If eponymy is to be avoided, alternate methods of naming must be used. Of course, the most common alternative or, rather, the standard to which eponymy itself has become a too-easy alternative, is the forming of new words from Latin and Greek elements. As long as the scientific community possessed even a rudimentary knowledge of the classical languages such a method worked well. However, today such classically derived neologisms approach

more and more closely the condition of eponyms; that is, they are mere tags or labels, and do not in themselves suggest anything about the idea or object being named.

New ideas which *are* worth naming are worth naming well. New terms in mathematics should be chosen from everyday language. That is, a common word should be selected which has one or more connotations suggestive of the mathematical concept to be named, and this common word should then be assigned a precise technical meaning. Concepts in mathematics manifest themselves in a variety of more or less familiar examples, of which some can invariably be related, albeit loosely, to the world of day-to-day experience. Such mining of the vernacular can enhance and enlarge the didactical role played by the technical vocabulary. Consider what rich associations spring to mind from the common experience of throwing dice in the name "random variable". Even brief encounters with cartography provide a basis for understanding the "four-colour theorem". Contemporary fashion notwithstanding, who would not easily grasp, on the basis of personal experience of love and courtship, the idea of the "marriage theorem"? Such terms can with a little effort be found for new mathematical and scientific phenomena as they arise, and such terms, unlike eponyms, do possess intrinsic descriptive content.

We propose a threefold course of action. First, where a mathematical concept already possesses both a descriptive name and an eponymous name, use the descriptive name. Second, where a new idea or technique is of questionable permanence, do not name it at all; a concept or technique useful only in a particular demonstration and which currently has no wider applicability can conveniently be designated by a symbol or legend in the text. Third, where the naming of a new idea *is* justified, provide a descriptive name by exploiting the riches of the vernacular. The conscious effort to avoid the use of eponymous terms in mathematics is a spur to the clear expression of significant ideas.

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