

Business Week Looks at Mathematics

“In past decades, the marriage of higher math and computer modeling transformed science and engineering...But just look at where the mathematicians are now. They’re helping to map out advertising campaigns, they’re changing the nature of research in newsrooms and biology labs, they’re enabling marketers to forge new one-on-one relationships with customers.”

—*Business Week*, January 23, 2006

Mathematics landed on the cover of the January 23, 2006, issue of *Business Week* magazine.¹ The article describes how modern business is using mathematics in new ways, most of them centered on mining the vast data sets being created by the Internet, as more and more people work, shop, chat, read, and do many other daily tasks online. The epigraph above comes from one of the article’s opening paragraphs. The article actually says little about what mathematicians are doing for “research in newsrooms and biology labs”. One quotation in the article holds that “The next Jonas Salk will be a mathematician, not a doctor,” but little is said about how mathematics is being used in medical research. Rather, the focus is on the use of mathematics in advertising and marketing.

The article acknowledges the somewhat eerie prospects the new uses of mathematics raise: “The power of mathematicians to make sense of personal data and model the behavior of individuals will inevitably continue to erode privacy.” Some hazards of this “mathematical modeling of humanity” are discussed, but for the most part the article paints a cheery, all-systems-go picture of how mathematics is helping to pump up businesses’ bottom lines. Google and Yahoo appear as prominent examples of how mathematics helps marketers pinpoint prospective customers by analyzing vast quantities of data about where people click or what words they enter into search engines. Another example is Harrah’s Entertainment, which runs casinos. The company gathers information about how long gamblers bet and how much they have won or lost, together with personal information, “to target individuals with offers, from getaway weekends to gourmet dining, calculated to maximize returns.” As proof that this really works, the article points out that Harrah’s averaged 22 percent annual growth and that its stock price has tripled. “Yes, it’s a magnificent time to know math,” trumpets the article’s final sentence.

¹The *Business Week* article is available on the Web at http://www.businessweek.com/magazine/content/06_04/b3968001.htm.

Am I the only one who was bothered by this article? I work with the small AMS Public Awareness staff on modest efforts to try to get more coverage of mathematics in the popular press, so one part of me was thrilled to see mathematics as the cover story in a large-circulation magazine like *Business Week*. On the other hand, the article’s message, that the new deployments of mathematics in advertising and marketing show that the field has truly *arrived*, left me dispirited. The idealism that is such a strong motivation in the development of mathematics is absent from the article.

The reason for *Business Week*’s decidedly *unidealistic* portrait of mathematics is clear enough: *Business Week* reports on business and has little use for idealism. The magazine is certainly right to say that “it’s a magnificent time to know math.” But if you want to get anywhere near the heart of the subject, you cannot be motivated solely by the bottom line: You must have some sense of idealism, a feeling for truth and beauty. As Roger Penrose put it in his acceptance statement for the 2006 Communications Award from the Joint Policy Board for Mathematics, “one cannot really properly understand mathematics without having some kind of appreciation of its aesthetic qualities.”

The *Business Week* piece is one among the nearly 1,200 articles that have been summarized in the AMS website feature “Math Digest”. For ten years, the Math Digest has tracked articles and broadcasts about mathematics appearing in the popular media. The early coverage of the Math Digest is somewhat sparse, since initially I was the only one working on it, but today we have four other contributors: AMS Public Awareness Officers Mike Breen and Annette Emerson, and two former AMS Mass Media Fellows, Claudia Clark and Lisa Dekeukelaere. I believe the Math Digest is today the most comprehensive resource tracking English-language coverage of mathematics in the popular media. Over 200 articles and broadcasts appearing in 2005 are summarized in the Math Digest.

The Math Digest is one component of *Math in the Media*, an online magazine provided free on the Web by the AMS. *Math in the Media* carries “Tony’s Take”, a monthly commentary on coverage of mathematics in the media, written by Tony Phillips of Stony Brook University, as well as a “Reviews” page with pointers to reviews of books, plays, movies, and television shows related to mathematics. Also on the AMS website is the *Feature Column*, which each month provides a lively and accessible introduction to a mathematical topic, aimed at the general public. To find any of these resources, go to the *Math in the Media* webpage, <http://www.ams.org/mathmedia>.

—Allyn Jackson

Classical Truth

The truth seems more classical than we thought it was!

Without any compelling reason whatsoever, the Copenhageners of the 1920s assumed that the Schrödinger equation would describe a single system. In doing so they threw out the very possibility of having an ensemble statistics for which a universe of discourse could have been established. Ironically, a 1912 calculation by Planck, (*Theory of Heat Radiation*, Dover reprint, 1959, p.141), in which he shows how an ensemble of harmonic oscillators requires an average energy $h\nu/2$ per oscillator to maintain a state of optimal phase disorder, confirms this decision-liability for the Copenhagen doctrine. Planck's counterexample suffices to invalidate any need for calling on a nonclassical statistics, a proposition not really recognized as a valid mathematical concept.

Unlike Copenhagen doctrine, Planck graciously permits us to deal with a free-space not everywhere filled with infinite energy. So, by the grace of God, we are not living in an optimally disordered world of infinite zero-point energy, which is perhaps why not all of us have as yet collapsed under an apocalyptic load of infinite gravity. In the 1930s there arose a movement (Popper, Kemble, J. Groenewold) pleading to replace Copenhagen's single system by an ensemble proposition. Jammer (*Philosophy of Quantum Mechanics*, Wiley, NY, 1974) gave an incisive assessment of this initiative covering the West and Russia; unfortunately the initiative did not quite make the grade, because it left the nonclassical statistics intact.

The following conclusion is now unavoidable. Planck's calculation shows no compelling reason for taking recourse to this notion of a nonclassical statistics. Since that proposition has not found recognition as a basic mathematical concept, its use in basic physics is also undesirable. In light of such serious objections, the Copenhagen doctrine is urgently due for immediate and incisive interpretive revision.

Physical ramifications of the cited mathematical criticism are available

in the public domain. Boston-Monograph BPS 181 is suggested reading as a preliminary guide for removing conceptual wrinkles through a quantum reprogramming (E. J. Post, *Quantum Reprogramming*, Kluwer, Ac. Press, Dordrecht-Boston, 1995, (Springer, 2005); "Quantum reprogramming: A long overdue and least intrusive reality adaptation of the Copenhagen Interpretation", *Ann. Fond. Louis de Broglie*, Vol. 30, nos. 3-4, 2005, p. 325). It would seem more focus is needed in preventing this self-perpetuating nonclassical myth of the past from adversely affecting contemporary physical truth.

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Don't Facilitate Military, Homeland Security Funding

This is an open letter to the AMS leadership.

We are extremely concerned that the Society not facilitate funding from the Department of Homeland Security to mathematicians. Many of their projects are based on dubious fear-based hypotheses, and some others are geared towards clear violations of personal freedoms.

The Society has no mandate for such activities. On the contrary, the membership voted in a referendum in 1988 on two motions calling on the Society to reduce the profession's dependence on military funding. The turnout was large, and the motions passed by healthy margins. The staff of the Society has never reported to the officers and members on their implementation of this policy, and indeed in recent years it seems to be no longer recognized. It was, however, never repealed, nor should it be.

We urge that military funding be avoided by mathematicians. The reasons are at least as strong now as in 1988: the so-called Anti-Missile Defense has been revealed ever more plainly as incapable of defending anything, and the country's military adventures are ever more flagrantly destructive. We also urge that the

profession avoid funding from the Department of Homeland Security, which since its creation has been conspicuously bumbling. It is not defending national security but only spreading alarm and insecurity in the minds of the public.

We urge that the Society's staff and officers never facilitate contacts of mathematicians with military funders nor with the Department of Homeland Security.

In addition to the names below, this letter has also been signed by 49 other mathematicians. A complete list may be found at http://www.math.temple.edu/szylid/AMS_Letter.

—Chandler Davis
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Short Story Set in Oberwolfach

Readers of the *Notices* may be interested in learning that Manil Suri has recently published a short story set in the Mathematics Institute at Oberwolfach. The story, "The Tolman Trick", deals with a Professor Tolman attending a conference at Oberwolfach, whose major result is suspected to be false by a young colleague. The atmosphere at Oberwolfach, the angst of Tolman, and some of the stress of math research, are well presented. In addition there is a lovely ending. The story is published in Issue 1 of a new literary magazine called *Subtropics*, whose website is <http://www.english.ufl.edu/subtropics>.

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