Theft of Words, Theft of Ideas

Plagiarism has become front-page news in the United States. The two most prominent cases have centered on the historians Stephen Ambrose and Doris Kearns Goodwin, who were accused of copying, without proper attribution, passages from writings by other people. Another recent case, which received less publicity but which is closer to home for mathematicians, concerns the book *Mathematical Mountaintops*, by John L. Casti, a mathematician and author of several popularizations of mathematics. Oxford University Press (OUP) published the book in October 2001. Mathematics journalist Barry Cipra was reading the book in preparation to review it when he noticed similarities to things he himself had written. Some additional digging revealed that many passages in *Mathematical Mountaintops* are nearly identical to passages in works by about fifteen authors (including me). The AMS and the Society for Industrial and Applied Mathematics, which published some of the works involved, complained to OUP on behalf of all the wronged authors. In March 2002 OUP recalled the book. Casti sent to each affected author an apology in which he admitted to "a glaring lapse of professional ethics" and an "outrageous error of judgment."

The cases of Ambrose, Casti, and Goodwin are examples of plagiarism of words, in which an author copies sentences or paragraphs from someone else's writing, perhaps with a few superficial changes. I would argue that this kind of plagiarism is not a big problem in mathematics. For one thing, what might at first glance look like plagiarism of words may simply reflect the strictures under which mathematicians labor in rendering precise ideas into words. As Edward Rothstein put it in an editorial about the Casti affair ("Plagiarism that Doesn't Add Up," *New York Times*, March 9, 2002), "in mathematics a theorem will often allow little paraphrase." In how many ways, he asks, can one refer to something like "an elliptic curve that violates the Taniyama-Shimura-Weil conjecture"?

Nevertheless, plagiarism of words does occur in mathematics; I know of a case in which a mathematician was reading through a paper by someone else and realized that many of his own carefully crafted sentences had been copied without change from a paper he had written. Though odious, this kind of plagiarism does not seriously affect the field of mathematics. That a mathematician would resort to this kind of copying reveals a lack of independent understanding of what he or she is writing about. And in mathematics, unless one understands things for one's self, one does not get very far.

Another example: A paper written by two well known mathematicians had been accepted for publication when another colleague familiar with that paper received a manuscript to referee. This manuscript, bearing the names of two mathematicians at an obscure university, was word-for-word exactly the same as the original paper; only the authors' names and one sentence in the introduction had been changed. The journal followed the referee's recommendation to reject the manuscript. Given that there are close to 700 mathematics journals worldwide, it is possible that the bogus authors eventually got the paper published under their names. But again, it seems unlikely that those who would attempt such a scam would ever have much influence in the field.

Ideas are the stock in trade of mathematics, and it is when ideas are stolen that true theft has occurred. Plagiarism of ideas is much more pernicious in mathematics than plagiarism of words. A true story: Student A finishes an outstanding doctoral thesis in mathematics at a top university. He is more than willing to talk about his results, and during a visit at another university he spends several hours explaining them to B. Some months later, when A submits his thesis work to a journal, he finds out that B and C have submitted the same results in a paper of their own. Those who know the parties involved are sure that B and C stole A's ideas. But unlike when words are stolen, it is much harder to produce airtight evidence of theft of ideas. The papers end up appearing side by side in the same issue of the journal.

The AMS has a set of Ethical Guidelines (reprinted in this issue, pages 706–707), and the AMS Committee on Professional Ethics is sometimes called upon to examine individual cases. But because plagiarism in mathematics rarely becomes public, it is very difficult to gauge how common these problems are. Much more common are the smaller questions of ethical behavior in writing that confront mathematicians every day. What level of detail is appropriate when giving credit? Sometimes a casual remark in the department tea room can lead to new insights. Should such a remark be acknowledged? In what cases does it suffice to credit only published works and not private conversations? More questions arise in choosing which references to cite. If D publishes a great new theorem and E publishes a tiny generalization, should F in a later paper using D's theorem refer to D, to E, or to both D and E? When E=F, it may be tempting for E to refer to only his or her own earlier paper.

Depending on the context in which plagiarism occurs, the theft of words and the theft of ideas can be equally wrong and harmful. Mathematicians like to think their own field is above such things—and usually it is. A public accounting of plagiarism cases in mathematics would be counterproductive. But some individualized steps—such as talking frankly with one's graduate students about ethical behavior in writing—might help. For it is up to individual mathematicians to ensure that, collectively, they do the right thing.

—Allyn Jackson
Senior Writer and Deputy Editor

Letters to the Editor

All Questions Answered

The March–April issue of *American Scientist* contains Gregory J. Chaitin's article "Computers, paradoxes, and the foundations of mathematics" [**90** (2002), no. 2, 164–71] in which he discusses the impossibility of answering certain questions. Just hours after reading that article, I was grateful to receive the March issue of the *Notices* that contained Knuth's article "All questions answered". Thank you for the timely article.

—Jay Kangel
Minneapolis, MN

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A Beautiful Mind

After returning from a showing of the film *A Beautiful Mind* (see AMS *Notices*, April 2002) my neighbor said to me, "Now I understand better how your mind works." My response (paraphrased for brevity) was to say, "I have the same profession as the main character of this movie, not the same disease!"

The stereotype of a "crazy" mathematician can be seen in many fictional presentations of mathematics. (Both the recent novel *Uncle Petros and Goldbach's Conjecture* and *The Bishop Murder Case* from 1929 explicitly argue that math research frequently causes insanity.) Of course, *A Beautiful Mind* is based on the true story of an important mathematician who suffers from paranoid schizophrenia, and so it cannot be faulted for attempting to convey this aspect of his life. In fact, as Butler's review explains, this film is seen by many as a successful work of art conveying some aspects of this disease to the audience. However, there is a danger that many audience members who have little experience with real mathematicians will confuse the attempt to present schizophrenia with an attempt to present "the mind of a mathematician". (In addition to the example of my neighbor mentioned above, I can also use as evidence a quote overheard at the showing of the movie. At one point during the film when Nash's life seemed especially unenviable, the person sitting behind me said, "Boy, I'm glad that I'm not a genius!" Note that this implies that the film was about what it is like to be smart, not what it is like to suffer from a mental disorder.)

I know many mathematicians who liked this movie and many who did not. In any case, when discussing it with nonmathematicians, I believe we should make certain that they understand that mathematics does not cause insanity and that mathematicians, as a profession, are as sane as anybody else.

—Alex Kasman
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Editor's Note: The cover illustration of the February 2002 issue depicted Archimedes' cattle, and some readers inferred that a main point of the associated article by H. W. Lenstra Jr. was to display a new solution to the cattle problem. This inference is incorrect because, as indicated in the article, the solution of the cattle problem is implicit in the 1880 work of A. Amthor. The significant mathematical developments discussed by Lenstra concern the algorithmic efficiency of methods for solving Pell's equation.

Readers who desire more information specific to the cattle problem may wish to consult a paper by Ilan Vardi ["Archimedes' cattle problem", *American Mathematical Monthly* **105** (1998), no. 4, 305–19], where they will find a lengthy bibliography along with a detailed exposition of an explicit solution of the cattle problem similar to the one presented by Lenstra.

—Harold P. Boas

About the Cover

Applied Mathematics

This month's cover accompanies Karl Hofmann's review of the art of Bernar Venet (pages 663-668). Laying down mathematical symbols on large canvases is not normally what one means by applying mathematics, certainly. Whereas to a mathematician the symbols have meaning, to Venet they seem to be just surface texture, rather like hieroglyphics to the Greeks. Of course the exposition of mathematics has always involved careful consideration of how it is to be displayed. Venet's art will be controversial among mathematicians, but it should be valuable to nearly all of them to see its artistic component carried to an extreme. Particularly interesting might be the somewhat aggressive tone of mathematical symbolism writ large. To how much of the population does all mathematics appear so fearsome?

The images on the canvases are taken from (left to right) *Planar graph blocking for external searching* by S. Baswana and S. Sen, *Theory of measurement* by J. Pfanzagl, and *Basic probability theory* by R. Ash. The photograph was taken at Venet's studio in Le Muy, Var, France. All photographs of Venet's work used in this issue were supplied by Venet himself.

—Bill Casselman
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