Book Review

# A Mathematician Reads the Newspaper

*Gina Kolata*

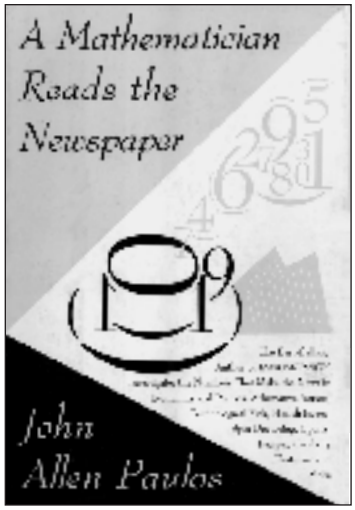
**A Mathematician Reads the Newspaper**
*John Allen Paulos*
*212 pages*
*Basic Books*
*$18.00 Hardcover*

John Allen Paulos, who sprang to fame with *Innumeracy*, has written another book meant to open the eyes of the mathematically curious. *A Mathematician Reads the Newspaper* is his attempt to educate the public about the uses—and misuses—of mathematics in newspaper articles.

It is a laudable aim. As a science and medical reporter for the *New York Times*, I have done my own share of privately railing against press releases that mislead by misusing mathematics and statistics and bemoaning reporters who might benefit from a bit more numeracy. And I have often said that the main advantage to me of having studied mathematics is that it taught me to think.

But I am not sure that Paulos succeeds with his book. It is hard to know how illuminating his exegesis will be for the mathematically naive, but I suspect that few will come away with the sort of insight that might enable them to read news stories more critically. What may happen is that readers will become more skeptical of newspaper articles, especially those that go against their own prejudices or preconceptions, without having the tools to analyze the articles.

I can, however, say with some confidence that readers of the *Notices* will already know all of the mathematics that Paulos presents and will learn little about newspapers and reporting from his book.




I had very mixed reactions to *A Mathematician Reads the Newspaper*. Although it is a short book with a sprightly air that makes it seem inviting, I felt as though I was slogging through it. It never came alive because Paulos rarely gave fresh examples of newspaper stories that might have benefited from mathematical insights.

On the other hand, I enjoyed getting to know Paulos through this book. He seems to be a likable academic with an infectious enthusiasm for his subject. He loves newspapers and mathematics, he seems to be earnest and well meaning, and he loves corny jokes, even going so far as to repeat the joke about the drunk looking for keys underneath the streetlight (p. 26). Ever the professor, he cannot resist sprinkling his text with little questions for those earnest students who want to challenge themselves. In a section on reporting risks, he throws in an anecdote about an advertisement he remembers reading when he was a child, offering land in Colorado

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for 25 cents a square inch. "What would an acre of this undoubtedly desolate land cost? A square mile?" he asks. The answers are in a footnote (p. 142).

But, as an inveterate reader of book reviews, I also know the frustration of being misled by a review that is too forgiving. The question I always want answered is, Should I read this book, or should I recommend it to a friend? To be honest, in the case of Paulos's book, I have to say that the answer to both questions is no.

It is, to begin with, an unusual book. It might have been more appropriately titled *A Mathematician Writes a Newspaper*—and a newspaper in which, oddly enough, every article, even the recipes, is an editorial. "The format of this book will be loosely modeled after that of a standard newspaper," Paulos writes in his introduction (p. 4). And, sure enough, he starts with a section called "Politics, Economics and the Nation", moves on to "Local Business and Social Issues", and eventually ends up with "Food, Book Reviews, Sports, Obituaries". Each section is made up of very short—two- to three-page—commentaries with titles written to sound like headlines of news stories. Thus we have, in section one, a chapter called "Recession Forecast If Steps Not Taken. Unpredictability, Chaos, and Pooh-Poohing the Pooh-Bahs". In a section on "Science, Medicine, and the Environment", we have "More Dismal Math Scores for U.S. Students. X, Y, and U".

But these are not news stories or anything like them. The only resemblance is the headlines. What they are are excuses for Paulos to expound upon subjects that seem dear to his heart. For example, the chapter "DNA Fingers Murderer. Life, Death, and Conditional Probability" has nothing to do with any actual murder and precious little to do with DNA. Instead it is a 1 1/2-page discussion of conditional probability. For mathematicians, the discussion is unlikely to be of interest because they will already know everything that Paulos says. For nonmathematicians, Paulos frequently is understandable, but at times he jumps too quickly into technicalities.

A prime example comes in one of the first chapters, called "Recession Forecast If Steps Not Taken". It is a chapter on nonlinear dynamical systems. But how many general readers will be comfortable with Paulos's explanation of nonlinear dynamical systems as "mathematical spaces on which vector fields are defined"? He follows this by an explanation: "A vector field may be thought of as a rule $f$ saying, in effect, that 'if an object is currently at point $x$, it moves to the next point, $f(x)$, then to point $f(f(x))$, and so on.' The rule $f$ is nonlinear if, for example, the variables involved are squared or multiplied together and the sequence of the object's positions is its trajectory. A mathematical subterfuge allows us to consider the movement of a fictitious object around a very high-dimensional space instead of the movement of many objects around a lower-dimensional space" (p. 23).

To illustrate nonlinear dynamical systems, Paulos chooses to use the Laffer curve of the Reagan era. But he gives no insight into why one would expect chaotic behavior in this economic model. A more pertinent example might have been climate models predicting global warming. Paulos, however, never mentions that topic, even though he uses Lorentz's butterfly effect to illustrate the sensitivity of nonlinear systems to initial conditions.

Paulos's occasional lapses into dense, jargon-laden technical prose might have been unimportant if he had given his readers some insight into actual news stories. So I looked eagerly in the section on "Science, Medicine, and the Environment" for such illuminating details. These are subjects that I know well, that I write about every day, and I can easily think of examples of stories that were missed, misunderstood, exaggerated, or underplayed because reporters did not always appreciate the subtleties of mathematics.

But I was disappointed. For example, the chapter called "More Dismal Math Scores for U.S. Students" could have discussed the difficulties of comparing test scores of American students to those of students in other countries. Paulos could have looked up a slew of newspaper articles over the years bemoaning the poor performance of Americans and the few articles explaining why it is essentially impossible to compare scores when the student populations are so different. But instead the chapter is Paulos's plea for Americans to care more about mathematics and to recognize its importance in their everyday lives. It is a chapter decrying innumeracy.

In fact, one of the striking features of *A Mathematician Reads the Newspaper* is that almost never is a single newspaper article referenced, no newspaper article is discussed in any detail or quoted from, and even when a paper is mentioned, Paulos almost never gives the date of an article. Instead, he will say such things as, "Recently, although their stories reported on the same events and the same day, the *New York Times* and the *Wall Street Journal* headlined them, respectively, as…" (p. 29). But what day is he talking about? And, of course, most readers might want to know whether the two papers that had different headlines nonetheless had similar stories.

The book's index cites the *New York Times* more than any other newspaper, with fourteen references to it. But only six of those refer to spe-

cific articles, and those references are as fleeting as the one about the headlines in the *Times* and the *Journal*. Paulos says that the *New York Times*, the *Washington Post*, and the *Los Angeles Times* are the most influential papers, but he mentions the *Post* just four times: once to say he reads it, once to say that it was cited in an analysis of op-ed columns, once to say it is one of the three most important papers, and once to say that it and the *Times* published profiles of John Mack, the Harvard psychiatrist who wrote of people being abducted by aliens. The *Los Angeles Times* gets similar short shrift with just three mentions, one of which is being the note saying that it is one of the top three papers.

Sometimes Paulos seems trapped by his format, seemingly at a loss for something to say about his newspaper sections on such things as obituaries or society pages. I have to sympathize. Where, after all, is the mathematics in obits? But Paulos somehow pulls through. In a chapter on obituaries, he writes: "I wonder about the relationships among the obituary's length, $L$; the deceased's achievements, $A$; his or her fame, $F$ (which is largely independent of achievement); and the interval between these and death, $I$; and the number of other 'important' deaths that day, $D$. Maybe it's something roughly like $L = (A \times F^2)/\sqrt{I} \times D$" (p. 199). This, of course, tells us nothing about obituaries and nothing about the power of mathematical reasoning. Paulos could have spoken to an obituary writer or an editor if he really wanted to understand how newspapers decide whose obituaries to write and how long they should be. But then he would have been hard pressed to find any mathematics to discuss.

And that is the crux of my quarrel with this book. It seems to be a series of observations, written to conform to the artificial structure of what Paulos conceives as a newspaper-like book. Paulos shows little sign of having undertaken even the most minimal search through Nexis or some other data base to find newspaper articles that might illustrate his points. He does not seem to understand much about newspaper writing, and he does not seem to have taken care to make his mathematics comprehensible to the general public.

The book ends with advice to reporters and to newspaper readers. As Paulos says, this "concerns issues of journalistic hygiene and what we can do to improve ours"—a particularly distasteful way of putting it, I think (p. 202).

He suggests a series of questions that reporters should ask, some of which are useful. I wish more reporters would ask, as he suggests, whether conclusions were drawn from a valid study or a collection of anecdotes.

Others, however, struck me as off base. In particular, I question his suggestion that reporters ask, "What is known about the dynamics of the whole system? Are they stable or do they seem sensitive to tiny perturbations?" (p. 202). The job of a reporter is to discern in interviews whether experts in a field think that a finding is solid. We are not referees, and there is no way on earth that we or readers concerned with "journalistic hygiene" are going to be able to judge a result independently. Our job is to do a thorough job of reporting and then to tell a story in plain English, to explain why the story is important and why people are reading it now—in other words, why it is newsworthy. Mathematicians' jobs are to tell us if a result is less than it might seem or if it is better than we might realize.

Unfortunately, I do not think that *A Mathematician Reads the Newspaper* will help either those of us who are reporters or those of you who read the *Notices* to do a better job.