

Throw Away That Science Book!

“Errant Texts” and “Where’s the Book?” by Janet Raloff, in *Science News* (Mar. 17 & 24, 2001), 1719 N St., N.W., Washington, D.C. 20036.

*Don't know much about history,
Don't know much biology.
Don't know much about a science book,
Don't know much about the French I took.*

Those memorable lines from Sam Cooke’s “Wonderful World,” that golden oldie from 1960, could well be the anthem of American students today, to judge from the grades they regularly get on international tests in science and math. U.S. fourth graders did poorly in 1996, and four years later, as eighth graders, they did even worse, trailing their counterparts in 17 other countries. Ironically, a big part of the problem may be that very science book they don’t know much about.

A recent study of the dozen physical-science textbooks most widely used in American middle-school classrooms found them riddled with errors, reports Raloff, a senior editor at *Science News*. Reviewers, led by John L. Hubisz, a physicist at North Carolina State University in Raleigh, compiled a list of mistakes 500 pages long. “Diagrams often did not display what the text or caption indicated,” Raloff says. “Sometimes a book asked questions that were impossible to answer—either because it offered too little information (for example, the values for two dimensions when the student needed to compute volume) or because explanations necessary to solve a problem wouldn’t appear for another couple [of] pages or even chapters.” Scientific principles were often depicted or defined incorrectly.

But errors of fact are just part of the problem. Summarizing a 1999 study of 10 texts sponsored by the American Association for the

Advancement of Science, project director George Nelson says, “Even if the science had been 100 percent accurate, students still wouldn’t learn from these books, because the instruction [in them] was inadequate.” Often, legions of facts were crammed into the texts, with little to connect them.

The middle-school textbooks are typically put together by an editor working with contributions from contract writers who often have little control over the final product. And the results are less likely than high school and college science textbooks to be vetted by professional scientists.

One exception to the dismal rule, Raloff found, is *Introductory Physical Science* (1999, seventh rev. ed.), written by a team of scientists and science teachers, and warmly praised by textbook critics. Originally brought out by Prentice Hall in 1967, the book “briefly became a top selection for eighth- and ninth-grade classrooms,” Raloff says. Since the early 1990s, it’s been published by co-author Uri Haber-Schaim’s firm, Science Curriculum. But the book doesn’t sell well enough to have made Hubisz’s study of the top dozen.

Some science educators want to get rid of the middle-school textbooks entirely, says Raloff. Larry Malone, a curriculum developer at the University of California’s Lawrence Hall of Science in Berkeley, and others favor having students learn scientific principles and methods of analysis by working together on investigations of hypothetical oil spills, epidemics, and the like. Students, they hope, would then be singing a different song.

Enlightened Architecture

“X-Ray Architecture” by Ken Shulman, in *Metropolis* (Apr. 2001), 61 W. 23rd St., New York, N.Y. 10010.

For four years, Bill Price, a lecturer in the University of Houston College of Architecture, has been working on an invention that could be architecture’s next cool thing, dramatically changing the way buildings (and other things) look and function: translucent concrete.

Price’s quest began when he was director of research and development for the Office of Metropolitan Architecture, the Rotterdam firm of avant-garde architect Rem Koolhaas. “Could we make the concrete translucent?” Koolhaas asked at a meeting about a concert hall

the firm was designing. “Koolhaas may have been the first to utter the words,” notes Shulman, a *Metropolis* contributing editor, “but there’s no question that it’s Price’s baby.”

Price began a systematic analysis of concrete to find out which of its elements—aggregate (usually crushed gravel), binder (customarily cement), reinforcement (normally steel rods), and form—or which combination of elements, could best be made to transmit light. He came up with a translucent concrete made from a crushed-glass aggregate and a plastic binder; for reinforcement, he also turned to plastic. The initial samples of translucent concrete appeared two years ago. Lit from underneath, says Shulman, a sample poured block of

translucent concrete “seems to breathe light like the sun breaking through winter ice.”

“Price believes his material could be used in construction as well as for design objects: bathtubs, toilets, tables, even lamps and lampshades,” Shulman writes. But many questions—about thermal dynamics, seismic stability, and other crucial matters—remain. Tests so far are promising, Shulman reports, but large-scale applications may be many months, even years, away. The cost of the new material is likely to be high: perhaps five times greater than that of traditional concrete. But the price may be right if Price is right about the promise of see-through concrete.

Farewell to Linguistics?

“The End of Linguistics” by Mark Halpern, in *The American Scholar* (Winter 2001), 1785 Massachusetts Ave., N.W., 4th fl., Washington, D.C. 20036.

In today’s wars over English usage, strict constructionists battle a growing corps of linguistic freethinkers, who take an “anything goes” approach to language. After all, these anti-authority folk say, language is a living, growing thing. Why fetter it with artificial rules and regulations?

Rubbish, says Halpern. “Language is not living, not growing, and not a thing; it is a vast system of social habits and conventions, inherited from our forebears, and showing every sign of being an artifact rather than an organic growth.” It changes—but it does so “when *we* [emphasis added] change it, and the metaphor that makes it autonomous only obscures our real task, which is to consider just how and why we change it.”

What has given that metaphor of language as a natural and autonomous creature such influence? In large part, Halpern believes, the culprit is the failed science of linguistics. The modern discipline began with much fanfare in the 18th century. Sir William Jones’s recognition in 1786 of the relationships among Latin, Greek, and Sanskrit led to the idea of an Indo-European family of languages. And linguistic scholars’ subsequent efforts to identify other such relationships and families were so successful that in the late 19th and early 20th centuries, linguistics seemed well on its way to becoming “a science—a discipline dedicated to

elucidating the laws that govern an order of nature.”

But linguistics has not lived up to its early promise, Halpern maintains. Since the 19th century, “no great new principles have been formulated, no epoch-making discoveries have been announced.” Not that linguists have not been busy on all sorts of interesting projects: “Some are in effect anthropologists, gathering linguistic data from remote peoples”; others, following linguist Noam Chomsky, “try to find ‘deep structure’ behind language’s façade”; still others study how children learn to speak, or try to teach apes or whales the basics of human language. But there’s no sign of the “comprehensive and unified theory of language” that would have cemented linguistics’ status as a “natural” science.

What does the future hold? Halpern predicts that linguistics “will be broken up, and its fragments annexed” by related disciplines, “as geography has been.” Good riddance, as far as he is concerned. The English language can only benefit if the educated public, led perhaps by writers and philosophers, regains authority over the way it is spoken and written. “In the hands of its most skillful users rather than in those of its academic observers, the language will take on not an independent life, but the dignity and efficiency of a tool shaped and wielded by its proper masters.”