

scientific value as the flight might have had. Because helium has less lifting capacity than hydrogen, half the scientific equipment that was supposed to be aboard had to

be dumped. As would become evident three decades later, the debate over manned-versus-unmanned exploration of the high frontier was far from over.

False Prophets

"Great Expectations: Why Technology Predictions Go Awry" by Herb Brody, in *Technology Review* (July 1991), Building W59, MIT, Cambridge, Mass. 02139.

It was the bright world of tomorrow. Solar cells and nuclear fusion were to provide pollution-free electricity, automobiles were to run on batteries, factories were to rely extensively on robots, and videotex terminals were to be important fixtures in American homes. But the technological future envisioned just a few years ago has failed to arrive, notes Brody, a senior editor of *Technology Review*. Innovations like nuclear fusion "seem, as always, to be at least a decade from practicality."

That's the way it usually goes with experts' technological forecasts, Brody says. And the result, he adds, is not just red faces but misspent scientific careers and misallocated money for research.

Why are the much-publicized predictions so often wrong? Several factors are involved, according to Brody. One is conflicts of interest. "Interested parties include not only the companies that stand to make money from a technology but also scientists whose funding grows and wanes with the level of public excitement." Researchers working on nuclear fusion, for instance, "have kept up a steady barrage of 'breakthrough' reports since the mid-1970s."

Consulting firms such as Dataquest and Business Communications, which analyze the business potential of emerging technologies, feed the bonfires of optimism. "Over the past decade," Brody writes,

"outfits like these have foretold billion-dollar markets for artificial intelligence, videotex, and virtually every other new technology that laboratories have reported." Part of the problem is that the market researchers survey the wrong people: the new technology's vendors. Surveying potential buyers would make for more realistic projections, but also would be much more expensive.

The news media, of course, are ever willing to give hype a hand. Once published, the forecasts of "the experts" take on a life of their own.

False optimism about new technologies is also encouraged by underestimating the potential of old ones. "Theoretically, it's been possible for the past 25 years for computers to eliminate photographic film," says Du Pont executive Alexander MacLachlan. But thanks to continuing chemical refinements, he notes, silver-halide film has remained in the center of the picture.

"Any truly revolutionary technology defies easy prediction," Brody says. Computer designers in the mid-1970s still aimed to build ever larger behemoths. Few appreciated the value of personal machines. In fact, Brody says, from IBM's study then of what computer users said they wanted, the firm "reportedly concluded... that PCs would appeal only to a small group of hobbyists."

A Plague Of Scientists?

"Do We Need More Ph.D.'s, or Is Fewer Really Better?" by Constance Holden, in *Science* (Mar. 1, 1991), American Assoc. for the Advancement of Science, 1333 H St. N.W., Washington, D.C. 20005.

Some specialists are worried that the United States is producing too few scientists, but not Georgia State University

economist Paula Stephan. She thinks there already are far too many of them, reports Holden, a *Science* writer.