

Safety speculations

David L. Sills

Technological Risk. By H. W. Lewis. Norton: 1990. Pp. 353. \$22.95.

WE live in an age that questions authority: of government, of religion, of art, of taste. Western civilization itself is in some quarters assailed as merely the product of 'dead white males'. The authority of science and technology is also widely questioned, and with some success, as exemplified by the impact of AIDS activists upon the availability of therapy and the conduct of research.

This *Zeitgeist* is the setting for H. W. Lewis's *Technological Risk*, but it is not the context that particularly interests him. Lewis, a distinguished American nuclear physicist with extensive experience on government and other risk-assessment panels, presents a somewhat different model of contemporary society. He believes that 'qualified scientists' are given less attention than journalists and other doomsayers, and he concludes his analysis with these characteristically breezy words:

The fact that, as a population, we are so uncomfortable with and ignorant of science and technology, and innumerate to boot, seems to make us irresistible targets. Beware of pseudo-experts with a mission and a grudge, especially if they are lawyers pretending to be scientists.

This ignorance or this *Zeitgeist* — encouraged by such tragedies as Bhopal, Chernobyl and *Challenger* — has led to a rash of books on safety, risk and accidents, and *Technological Risk* takes its place in this literature. It is neither a blueprint for Doomsday nor an overly complacent description of the joys of science and technology. It is, rather, a balanced analysis: I would characterize its ideological position as somewhat right-of-centre. Lewis thinks that most technological risks are vastly over-stated, but he is far from complacent about others. Let me attempt a summary.

Lewis concludes not only that most risks are small but also that science and technology have vastly increased human happiness and welfare; he asserts that the quantitative assessment of risk is essential; and he admits that quantification is extremely difficult. (He places much emphasis upon probability and he uses throughout the book what he calls "the famous square-root-of-N rule, though no learned statistician would call it that." For example, in discussing the claim that the population living 'downwind' from the Three Mile Island nuclear power plant had excessive cancer mortality, he reports that the normal or expected mortality during the three years following the accident

would have been 142, whereas the observed number was 144. The square root of 144 is 12, so "we would expect fluctuations of about 12 in this number, so the difference between 142 and 144 is of no significance whatever.")

One cannot quarrel (although some do) with the two risks he feels most strongly about: smoking leading to lung cancer and overpopulation leading to excessive CO₂ in the atmosphere and other threats as

IMAGE UNAVAILABLE FOR COPYRIGHT REASONS

The crew of the ill-fated *Challenger* — victims of bad management?

well. He quite properly attributes the Bhopal and *Challenger* accidents to "bad management", and he readily admits the dangers of lead poisoning, asbestos and of course the burning of fossil fuels — leading to acid rain, air pollution and the greenhouse effect.

Lewis understandably devotes more attention to demythologizing risks that he thinks are grossly overstated. He is very pro-nuclear power, but he thinks that more attention must be given to safety regulations. He thinks the concern over the proposed storage of high-level nuclear waste in special canisters in a Nevada mountain is misplaced: future people will probably welcome the discovery of these canisters, which will contain materials then in short supply. "High-level nuclear waste disposal is a non-risk", he asserts. And he is scornful of those who conclude that radon, X-rays, fluoridation, saccharin, formaldehyde, vinyl chloride and nonionizing radiation pose any risks.

Technological Risk is essentially nuts-and-bolts, but the theoretical chapter on the 'delusion of conservatism' is of consid-

erable interest. The general principle expounded is: "The worst-case fixation leads to failure in the better-than-worst world." If aeroplane wings are made too strong, an aeroplane is unsafe to fly; heavily-armoured knights often did badly in mediaeval warfare; excessive testing of emergency diesel generators wears them out before the emergency; if aeroplanes did not fly in bad weather, more people would drive cars, which is even riskier, and so on. If this chapter had been expanded into a theory of safety (along the lines of Charles Perrow's theory of accidents (*Normal Accidents*, Basic Books, 1984), this would have been a more stimulating book.

I quarrel with only one of Lewis's major conclusions: his dismissal of the 55 miles-per-hour speed limit in the United States, which was adopted for energy conservation reasons during the 1973-74 Arab oil embargo and has been maintained as a safety measure. Lewis computes that this limit saves about 2,000 lives a year but costs about a billion hours in lost time for truckers, businessmen and others. Each life saved costs society approximately \$5 million, he calculates, more than is spent in most regulatory activities. Well worth it, in my judgement. Let us find another way to subsidize the trucking industry.

Technological Risk is written in a breezy style that some will find refreshingly non-pompous; others may find it irritating if not insulting. Lewis describes his point of departure as "unabashedly American", but this should cause little difficulty for non-Americans except for the use of baseball to explain such concepts as probability and linear regression analysis. (I found these examples fascinating, but baseball, like some fine wines, does not travel well.) It is written for "intelligent readers, not specialists", and Lewis has concluded that the intelligent reader will not or cannot read technical reports. None are cited; the book has no footnotes, no references and no bibliography. A few reports of such organizations as the National Research Council are mentioned, without references. As he says in one technical discussion "if it sounds too complicated, trust the author."

I feel strongly that the United States and other industrial countries have benefited from participation by citizens in decisions concerning science and technology and they have grown beyond blind acceptance of the authority of one scientist. Documentation would not only have given the book greater authority, it would have made it more interesting. One of the publishing myths of our time is that readers do not like footnotes. On the contrary, many of us find them both essential and absorbing. □

David L. Sills is at 14 Crockett Street, Rowayton, Connecticut 06853, USA.