

ing with future crises like those at Seveso, Italy and Bhopal, India. It is not enough to invest gigantic sums in environmental clean-up or in compensation to victims if the true extent of their injury remains uncertain.

Arguments for better epidemiological studies are all the more compelling because the research foundation in the field already exists, including protocols for identifying 'sentinel' events (for instance, an unusual incidence of congenital cardiac anomalies often follows exposure to trichloroethylene in water). Yet in most cases, assessment of risk at hazardous-waste sites relies too heavily on inadequately validated modeling rather than actual measurement of nearby residents.

Indeed, the need to separate the health effects of toxic exposure from real but excessive public anxiety is also now evident in decisions handed down by the federal courts. Last month, a US appeals court overturned an EPA ban on asbestos, arguing that the environmental agency failed to weigh financial costs against public health benefits when it banned the use of asbestos in products including insulators, fireproof fabric, automobile brake linings and various building materials. The Toxic Substances Control Act (TSCA) of 1976, on which EPA based its ban, requires that agencies conduct a risk/benefit analysis of their actions. The court said, "...we do note that the EPA, in its zeal to ban any and all asbestos products, basically ignored the cost side of the TSCA equation."

By EPA's own figures, a total asbestos ban would save the lives of 202 people during a span of 13 years, at a cost ranging from \$76 million to \$106 million per life. No one disagrees with data that show inhaling asbestos fibres to be pathogenic to the lungs, but new scientific studies suggest that asbestos in solid form is not the hazard that free-floating asbestos fibre is. Furthermore, the court said, "Considering that many of the substances that the EPA itself concedes will be used in the place of asbestos have known carcinogenic effects, the EPA not only cannot assure this court that it has taken the least burdensome alternative, but cannot even prove that its regulations will increase workplace safety."

What we are seeing is an attempt by some researchers and judges to infuse the environmental movement with greater scientific rigor and common sense. There was a time when such thinking would have been regarded as heretical. But it is high time that rigor and common sense made their way into the debate about protecting the environment, which will in the long run be good for the environment and the public health. □

Recipe for prosperity?

US should convert emphasis on military technology to include commercial technology.

Does it matter that only 25 per cent of telephones in the land of Alexander Graham Bell are made in the United States? The decline in US commercial technology has been long coming and often even arrogantly dismissed as

insignificant because US companies retained world leadership at the cutting edge of high technology even as they lost market share in mass produced products. But can the US economy thrive on the strength of the few areas in which US companies still compete successfully in the world market — chemicals, pharmaceuticals and aircraft among them?

According to a new analysis by the Carnegie Commission on Science, Technology and Government (*Nature* 353, 198; 19 September 1991), the United States must commit itself to a strategy for the development of its technology base, commercial technology included. The challenge is particularly urgent in the light of the sudden, unanticipated demise of the Soviet Union as a military threat and the consequent changes in spending priorities at the Pentagon. Carnegie says that ever since the Second World War, the US has invested heavily in military technology, relying on spinoffs from Department of Defense research for innovation in private industry and manufacturing. But now, the Carnegie commission argues with good evidence, "defense-supported technology lags rather than leads the marketplace in many areas."

Republican administrations have followed fashion elsewhere in the past decade in staying shy of anything that might come close to a national technology policy, holding that a free market takes care of everything. True, the administration has paid lip service to the cause of competitiveness by setting up committees throughout the government, but these good intentions have been fitful and unfocused; no agency nor single office in the White House is in charge. The Carnegie commission makes a number of specific suggestions. It urges President George Bush to vest more authority in the Office of Science and Technology Policy, now headed by White House science adviser D. Allan Bromley (whose concern about technology policy is well known). The commission also calls for the transformation of the intellectually elite Defense Advanced Research Projects Agency (DARPA) into the National Advanced Research Projects Agency (NARPA), thus shifting the focus from military technology to what is called 'dual-use' technology.

These proposals would probably do very little harm, but they do not get to the root of the problem. Indeed, they have a quaintly old-fashioned air, reminiscent of the way in which European governments (notably the British and the French) have in the past sought to keep Japan's manufacturers at bay by sponsoring industrially relevant research. Most of these schemes have merely demonstrated that civil servants, however steeped in defence technology, are unskilled at telling what the commercial market needs. Yet present bickering over the European Community's support for manufacturing technology shows that the truth has not sunk home even in Europe, which abounds with past failures in the public sponsorship of industrial research. A more coherent policy from the US government might, as the Carnegie suggests, be useful but it is not sufficient. The private sector must take the lead and show some initiative of its own. □