

Letter from FC to *Scientific American*, 1995.

We write in reference to a piece by Russell Ruthen, "Strange Matters: Can Advanced Accelerators Initiate Runaway Reactions?," *Science and the Citizen*, *Scientific American*, August, 1993.

It seems that physicists have long kept behind closed doors their concern that experiments with particle accelerators might lead to a world-swallowing catastrophe. This is a good example of the arrogance of scientists, who routinely take risks affecting the public. The public commonly is not aware that risks are being taken, and often the scientists do not even admit to themselves that there are risks. Most scientists have a deep emotional commitment to their work and are not in a position to be objective about its negative aspects.

We are not so much concerned about the danger of experiments with accelerated particles. Since the physicists are not fools, we assume that the risk is small (though probably not as small as the physicists claim). But scientists and engineers constantly gamble with human welfare, and we see today the effects of some of their lost gambles: ozone depletion, the greenhouse effect, cancer-causing chemicals to which we cannot avoid exposure, accumulating nuclear waste for which a sure method of disposal has not yet been found, the crowding, noise and pollution that have followed industrialization, massive extinction of species and so forth. For the future, what will be the consequences of genetic engineering? Of the development of superintelligent computers (if this occurs)? Of understanding of the human brain and the resulting inevitable temptation to "improve" it? No one knows.

We emphasize that negative PHYSICAL consequences of scientific advances often are completely unforeseeable. (It probably never occurred to the chemists who developed early pesticides that they might be causing many cases of disease in humans.) But far more difficult to foresee are the negative SOCIAL consequences of technological progress. The engineers who began

the industrial revolution never dreamed that their work would result in the creation of an industrial proletariat or the economic boom and bust cycle. The wiser ones may have guessed that contact with industrial society would disrupt other cultures around the world, but they probably never imagined the extent of the damage that these other cultures would suffer. Nor did it occur to them that in the West itself technological progress would lead to a society tormented by a variety of social and psychological problems.

EVERY MAJOR TECHNICAL ADVANCE IS ALSO A SOCIAL EXPERIMENT. These experiments are performed on the public by the scientists and by the corporations and government agencies that pay for their research. The elite groups get the fulfillment, the exhilaration, the sense of power involved in bringing about technological progress while the average man gets only the consequences of their social experiments. It could be argued that in a purely physical sense the consequences are positive, since life expectancy has increased. But the acceptability of risks cannot be assessed in purely actuarial terms. “[P]eople also rank risks based on...how equitably the danger is distributed, how well individuals can control their exposure and whether risk is assumed voluntarily.” (M. Granger Morgan, “Risk Analysis and Management,” *Scientific American*, July, 1993, page 35.) The elite groups who create technological progress share in control of the process and assume the risks voluntarily, whereas the role of the average individual is necessarily passive and involuntary. Moreover, it is possible that at some time in the future the population explosion, environmental disaster or the breakdown of an increasingly troubled society may lead to a sudden, drastic lowering of life expectancy.

However it may be with the PHYSICAL risks, there are good reasons to consider the SOCIAL consequences of technological progress as highly negative. This matter is discussed at length in a manuscript that we are sending to the *New York Times*.

The engineers who initiated the industrial revolution can be forgiven for not having anticipated its negative consequences. But the harm caused by technological progress is by this time sufficiently apparent so that to continue to promote it is grossly irresponsible. •