to be information-retrieval computers, but no doubt I fail to understand.

Here, then, are three strong minds who see essentially the same phenomenon, the system of scientific technology brooding free and determining the future, though they evaluate it differently as horrible, neutral, or blessed.

Yet the gross history of the past hundred years does not reveal this free-floating technology. Scientific technology has certainly effected with its products, processes, and method most human beings and nearly every human function; in large areas it has created an artificial landscape and altered the balance of species; it has gotten off the planet and may destroy a good part of life on the planet. But invariably, in its quantity and the direction of its development, scientific technology has been in the employ of familiar human motives: either convenience, health, and excitement, or profits, power, and the aggrandizement of persons or groups. It has not been independent. On the contrary, it can be shown that the organization of recent scientific technology has, by and large, moved *away* from the traditional research autonomy of science and the principle of efficiency of technology, and under political, military, and economic control. If they were organized in their own terms, science and technology would be very differently organized. At present there is a waste of scientists' time and brains, and engineers are not allowed to decide like real professionals. And the increasing moral and ritual drives to standardization, rationalization, control, and self-control—what Max Weber called the Protestant Ethic—have not, in my opinion, been mainly due to technical routine but to new psychological obsessions to ward off insecurity, and compulsions to identify with power. People submit to inhuman routine out of fear and helplessness. And such routine is *not* of the essence of scientific technology. In the past both science and technology progressed better without such rituals, and they would do so now.

Yet I would not bother to make these academic remarks—which are partly matters of definition and largely depend on what one pays attention to—except that the present submissive state of scientific technology is a sad betrayal of the promise of independent scientific technology dreamed of by Thomas Huxley, Kropotkin, Veblen, John Dewey, Buckminster Fuller. They thought of science as humble, brave, and austere, and of technology as circumspect, neat, and serviceable. Working by its own morale, scientific technology should by now have simplified life rather than complicated it, emptied the environment rather than cluttered it, and educated an inventive and skillful generation rather than a conformist and inept one. It is the same with the effect of the technological development of communications. Norbert Wiener used to point out that repetition of communication just increases the noise; in general, he said, there is more new information in a good poem than in a scientific report, because it tampers with the code. Then, if our electronics media and printing media were doing their job, there would be less brainwashing and less gabble altogether; and Americans would not be spending six hours a day watching television and learning new habits of perception.

Jacques Ellul is mistaken about us miserable intellectuals. We complain not because we balk at technical progress but because we are disappointed in it.

2. THE MORALITY OF SCIENCE

Since I intend to complain about the present morale of scientific technology, let me first