

that utopian writers have stopped fantasizing in this direction. The fact remains that countries with a fifth or a tenth of our available technology have a way of life that is as good or better. I do not mean by this argument that we ought to cut back our technology, for human beings are bound to try out everything; but there *is* a problem here that we have no right to disregard as we do.

There is a new technological instrument of Political Economy that, ideally, could follow up some of the bewildering remote effects of innovation and detect the contradictions before they occur. This is computing costs and benefits. But it would have to be used authentically, focusing on what happens to people rather than on the convenience of the programmer or the aggrandizement of his system. Actual examples, in city planning, welfare, education, and foreign policy, have not been promising. They tend to omit from the equations factors that are unknown or that are stubbornly existing but excessively complicated, like individual differences, history, anomie, esthetics, the changeability of policy. Then, though wise and impartial, the computer cannot give its best advice, which might often be: Not safe! Do not overcommit! Take it easy! Make it human! Instead, on the basis of puerile theories, the programmers compute hard-nosed facts—"hard" facts are those with numbers attached—and bull through solutions to which human beings with the flexibility and fortitude that, God bless them, they have, adjust as best they can. The theories are thus confirmed.

4.

Let me suggest two kinds of remedies to restore morale to scientific technology. The first is to judge technology directly in terms of

the moral criteria appropriate to it as a branch of practical philosophy. (How odd it is that today this obvious proposal has an odd ring!) Consider a possible list of criteria: Utility, Efficiency, Comprehensibility, Repairability, Flexibility, Amenity, Relevance, Modesty. By utility I mean, for instance, not pushing brand-name variety that makes no practical difference, whether in cars or drugs; not building obsolescence into expensive machines as if they were children's toys. By efficiency, I mean especially not overriding the competence of technicians for the demands of the system; not disregarding thrift merely for convenience of administration—for instance, radical decentralization would often save on costs, as well as giving more control to those who do the work. Through comprehensibility of design and concern for repairability, we might alleviate the growing ineptitude of users and their bondage to repair men and corporation service stations. Through flexibility we might stave off the increasingly frequent disasters that occur when interlocking systems of technology break down as a whole because of stoppage in a part; we might ease the entry of small enterprises and new regions into the economy. By amenity I mean concern for the whole range of feelings, not with trivia like getting rid of billboards but with the frayed nerves of traffic congestion, the destruction of cities by freeways, the chewing up of landscape for quick profits and transient convenience; not breeding out the taste and maturity of food for the convenience of processors and packagers. By relevance I mean concern for human scale, the time, size, energy, need for space of actual people, rather than with the calculating of efficiency in abstract units of time, space, and energy. By modesty I mean not looming larger than a function warrants; caution about hasty commitment and overcommitment which by now have given us