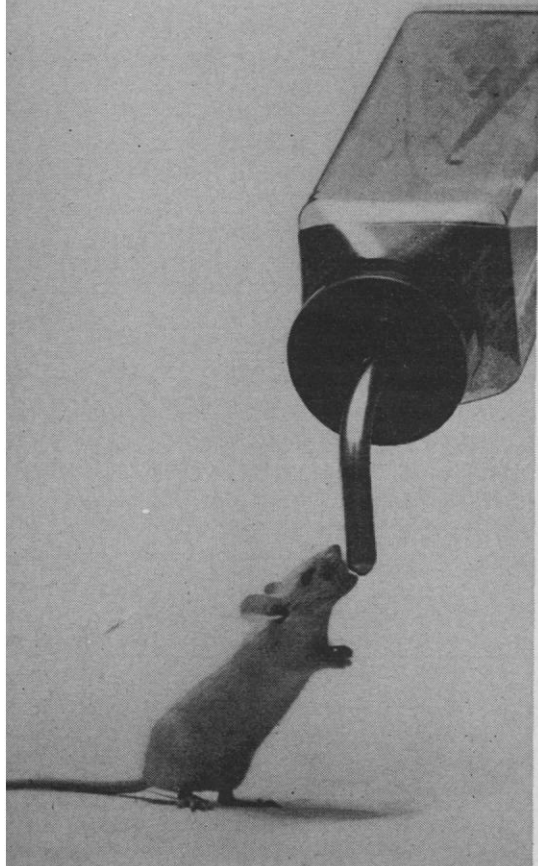


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## LETTERS

### Biomedical Engineering

In his article on biomedical engineering (19 Nov. 1971, p. 779), Leon Kass provides an optimistic view of the technological developments lying ahead, coupled with a thoughtful analysis of the problems involved in the manipulation of human bodies and minds through direct intervention. Of particular interest was his discussion of the social costs incurred in the application of these techniques to achieve potentially available benefits. This kind of tradeoff is pertinent to the application of many of today's technologies.

Unfortunately, a note of confusion might have been introduced by his use of the term "human engineering" as synonymous with "biomedical engineering." Although sometimes used in that sense, that is, to connote changes induced in people through biomedical techniques, "human engineering" is more widely used in almost the exactly opposite sense, namely, to refer to the design of equipment and machines in a manner that considers the behavioral characteristics of the people who must use them. In this latter connotation, the emphasis is on changing the environment to fit the human, rather than vice versa. There may be social costs as well as benefits involved in the latter approach, but they are undoubtedly a different set.

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Kass's true stance on the new biology is perhaps best shown in his reference 11 which deals with the possible value of genetically increased intelligence. He says, "Given the activities in which many, if not most, of our best minds are now engaged, we should not simply rejoice in the prospect of enhancing IQ. On what would this increased intelligence operate? At best, the programming of further increases in IQ. It would design and operate techniques for prolonging life, for engineering reproduction, for delivering gratifications. With no gain in wisdom, our gain in intelligence can only enhance the rate of our dehumanization."

Many will disagree with Kass's narrow concept of intelligence and of its role in civilization. Scarcely a week passes when I do not observe my academic colleagues advocating foolish

activities because they have narrowed a problem to the range of their understanding.

To the extent that I am privy to the worlds of industry, politics, and the military, I find that the evil done by the Establishment stems overwhelmingly from the stupidity of "men of goodwill" rather than from clever selfishness. By stupidity I mean inability to perceive abstract relationships and specific instances. What Kass sees as lack of an undefined "wisdom," I see merely as limited Stanford-Binet intelligence coupled with a narrow education. The humility and caution which Kass rightly advocates follow naturally from an understanding of the complexity of man's estate.

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In his stimulating article on the possibilities of the new biology, Kass quotes C. S. Lewis as writing that, "if any one age really attains, by eugenics and scientific education, the power to make its descendants what it pleases, all men who live after it . . . are weaker. . . . In every victory [over Nature], besides being the general who triumphs, he [man] is also the prisoner who follows the triumphal car."

There is nothing new in the idea that every age is the custodian of its heritage and that, as of today, any future age can cripple or destroy the human experiment. What is erroneous in this quotation is the supposition that perfected techniques of eugenics and education will result in a narrowing of genetic options for those who come after. This need not happen. It is highly improbable that it would happen, even if we did not perceive it as a special pitfall to be avoided. If this quotation from C. S. Lewis were the measure of human courage, we would still be running on four feet.

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Increased dehumanization, the "final erosion, of the idea of man as something splendid or divine, and its replacement with a view that sees man . . . as simply more raw material for manipulation and homogenization" and "Hence, our peculiar moral crisis" are rightfully stressed by Kass as the awe-inspiring consequences of modern biomedical technology. But is this

something new? Copernicus's discoveries must have had a much more shattering effect on his contemporaries. Was not castration, probably the oldest known biomedical technology, even more dehumanizing than slavery in a world deeply committed to fertility-oriented religion? There has always been a "morality gap." "We could justly accuse the whole human race, since we became human, of a morality gap; and this gap has been growing wider as technology has been making cumulative progress while morality has been stagnating" (1).

What is to be done? Plato, in presenting a history of Socrates' life, quotes his teacher as saying: "When I was young, I was interested in the current fashionable philosophy, which was physical science, physics and astronomy, and geology. I came to realize that the important thing in the universe is human beings, not non-human nature, not the movements of the stars and not the nature of the chemical elements. What is important is the human spirit, so I decided that I would turn away from the study of non-human nature and would study why it is that men know what is good, but do what is bad." Toynbee (1) calls this a turning point in Greek morality. This same search has to become the turning point of our times. But by new institutions only? By properly educated people who are wiser and more clever? This is only a small and unsatisfying part of the total answer. It is more important, if not essential, to revise the orientation of mankind and the definition of man's location in the universe and his fate—individually and as a race. This orientation has to be religious in nature. Science, since the age of enlightenment, has been dedicated to, or fond of, atheism. Science, despite its secular traditions, should accept religion as a prerequisite for survival. Teilhard de Jardin presented a model for the possible marriage of modern science and the religious craving that is inherent in man. The fact that Albert Einstein was a deeply religious man, convinced of the existence of God (2), only shows that the torchbearers of scientific progress might also be the new saints, giving guidance to the essence of all great religions; egocentricity, man's fundamental problem and the cause of the morality gap of yesterday, today, and tomorrow, can be conquered by surrendering to spiritual, nonpossessive love, a task which philosophies only rarely and pseudo-religions, like Lenin-

ism and Maoism, never have achieved. Individual awareness of man's dignity in this religious sense, acceptance of the individual's responsibility toward mankind, and education devoid of short-sightedness and close-mindedness toward tolerance and mental stability, seem to hold the key to at least partial avoidance of "the accidents of our hasty, biased, ephemeral judgments." Let us never cease hoping that enough time is granted to reach these goals before it is too late for the victims of those hasty, biased, and ephemeral judgments.

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1. A. J. Toynbee, *Surviving the Future* (Oxford Univ. Press, New York, 1971).
2. H. K. U. von Kessler, *In the Twenties: The Diaries of Harry Kessler*, trans. by C. Kessler (Holt, Rinehart, and Winston, New York, 1971).

#### Chest X-rays

*Science* is to be commended for its attention (see News and Comment, 10 Dec. 1971, p. 1114) to the ineffectual use of mass chest x-ray screening programs which result in unnecessary and avoidable x-ray exposure to the general population. In this connection, the U.S. Public Health Service, in cooperation with the American College of Radiology and the American College of Chest Physicians, issued a policy statement on 18 February 1972 that recommended discontinuance of the use of the chest x-ray screening procedure for detecting cardiopulmonary disease.

The Bureau of Radiological Health of the Food and Drug Administration, Department of Health, Education, and Welfare, took the lead in developing the policy as a part of its continuing efforts over many years to reduce unnecessary and unproductive radiation of the public from all sources. In particular, the statement on chest x-ray screening policy resulted from activities which the bureau initiated over 3 years ago, evolving through consultations with interested individuals and groups in addition to the two groups which co-sponsored issuance of the statement. This fact should be reassuring to those readers of *Science* who were not aware of our efforts.

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