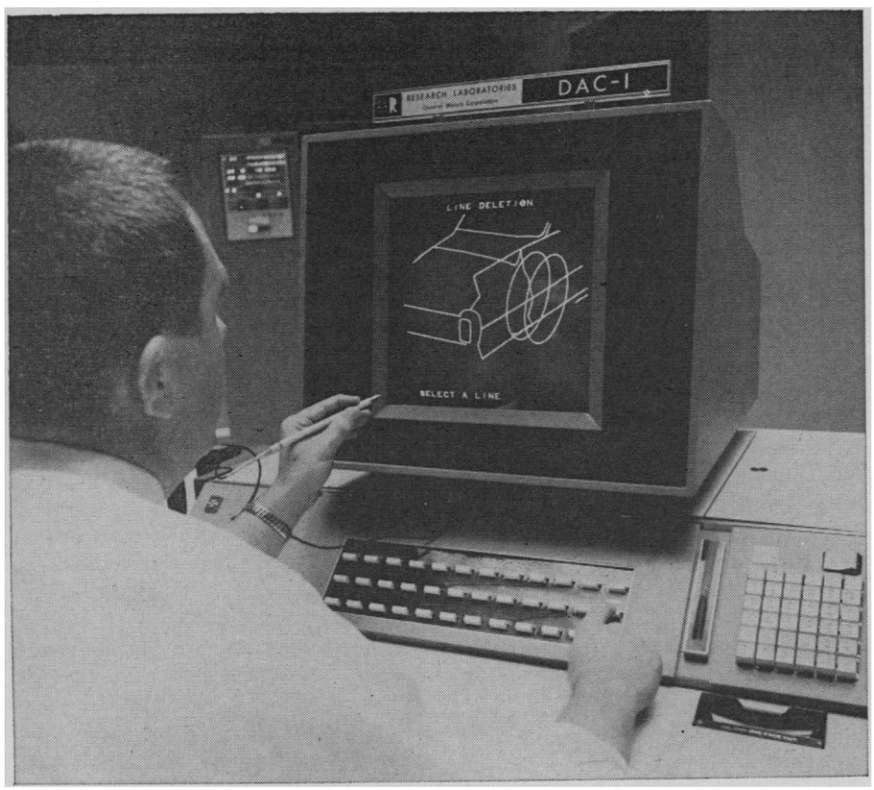
AAAS Symposia

Annual Meeting: Philadelphia

29 December

Man-Machine Interactions and Their Implications for Society



Communication of automotive design information between man and computer at the General Motors Research Laboratories using the GM DAC-1 system (Design Augmented by Computers). A research engineer checks out a computer program that allows him to modify a "design drawing." A touch of the electric "pencil" to the tube face signals the computer to begin an assigned task where indicated—in this case, "line deletion."

There seems little reason to doubt that the machine is the cornerstone of modern society. However, this hypothesis has mixed blessings, as many citizens, besides being aware of the material benefits of a highly industrialized society, are becoming increasingly aware of and concerned about its problems and the dangers of such a modern society. Societal goals and values, as well as the events in our daily lives, are increasingly stressed by the impact of our machine-oriented society.

It is time to take an accounting of the effects of machines on the lives of men and the evolution of society. To this end we seek to understand, for example, whether the rapid rate of technological change in our society is really causing the malady of failure in human adaptation called future shock, and we accordingly need to question seriously whether we are really in control of machine technology and can hope to remain so.

The complexity of man-machine interactions and their implications for society will be discussed by a number of speakers who will bring to bear their different viewpoints and backgrounds, ranging from that of the scientist and engineer to that of the sociologist, philosopher, and theologian. Each will discuss from his own position what he sees as the most significant aspects of man-machine interactions; what present trends in science and technology indicate the quality of man-machine interactions in the future; and how these interactions are likely to affect the identity of man and the workings of society. The discussion will also be concerned with whether we can control the effects of man-machine interactions so as to ensure beneficial consequences. Perhaps from such a consideration can emerge the criteria for technological assessment and a better understanding of the role of the man and the machine in the future.

The format of the symposium is designed so that the speakers in the afternoon session will be discussants in the morning session and vice-versa, thus assuring a full interaction among the panelists. In addition, the audience will be encouraged to enter actively into the discussion with comments and questions.

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30 December

Can We Develop an Index for Quality of Life?

Wouldn't it be enormously convenient to have a single, generally accepted index for the economic and social welfare of the people of the United States? A glance at the index would tell us how much better or worse off we had become each year and each decade. We could then judge the desirability of any proposed action of governmental policy by asking whether it would raise or lower this index. There are some who espouse such an index and believe that it is possible to construct it, and others who are pessimistic about the prospects.

Many believe in the usefulness of multiple indices, such as social indicators which would measure the state of health, the state of the physical environment, the prevalence of poverty, the oc-

currence of crime, the quality of education, and others. However, there is no acceptable way for aggregating these indicators into a single index. On the other hand, it is generally agreed that the usual economic indicators used in national income accounting, such as the gross national product, do not adequately represent "quality of life." The defenders of the gross national product (GNP) point out that it was never intended to be such an index and that it measures quite well what it is supposed to measure, namely, national output. They also point out that consumption of goods and services does have an extremely strong correlation to quality of life, at least in a society such as ours which places great emphasis on material goods. Perhaps a crude way to define quality of life would be in terms of having extra income beyond the basic necessities of life and having a wide choice of opportunities for spending this extra income in ways which are pleasant to the individual but not harmful to his fellow man.

If this definition were to be adopted as a working definition, it suggests that one may start with the per capita GNP (or, rather, net national product), and that one add items not in the GNP and subtract items not contributing to quality of life. Clearly, there are items that enter into the GNP that do not in any way contribute to quality of life but are simply necessary expenditures ("regrettables") to overcome various diseconomies—capital goods and property destroyed by crime and vandalism; pollution control expenditures which become necessary because of the environmental damages produced by an increasing population and increasing consumption, that is, by the very growth of the GNP; and the diseconomies produced by high population concentrations such as traffic snarls that lead to higher distribution costs; urban problems that demand more public expenditures for police, and so on. On the other hand, there are items that certainly contribute to quality of life and have been improving it year by year, but are not counted in the GNP. Leisure time has been increasing over the years as a consequence of higher productivity and the more effective use of capital. The life span has been extended and sickness has been reduced allowing people to live more comfortably, on the average. Recreational and cultural opportunities have been made available to a larger and larger fraction of the population. Most would count it as an increase in welfare which allows millions of Americans to watch a football game over television, or witness the exploration of the moon.

To those who accept the value of an index for quality of life the major problems have to do with measurement. The first part of the symposium addresses itself to this question of defining and measuring quality of life. In turn, this question breaks down into a number of subquestions such as:

1) What items do or do not contribute to quality of life.

2) How to measure and quantify the individual items.

3) How to handle items that cannot be quantified.

4) How to convert national income aggregates, such as the GNP, into an index for quality of life.

The second session addresses itself to a more fundamental critique of the whole concept through some of the following subquestions:

1) What really constitutes quality of life, as opposed to economic welfare?

2) What differences exist in the perception of quality of life because of cultural and anthropological differences?

3) Does the concept of an index as a national average make sense?

4) Who should determine quality of life—and for whom—in a stratified society?

It is perhaps too much to hope that in a brief symposium one would be able to settle, in any conclusive way, as fundamental a problem as constructing an index for quality of life. Nevertheless, this symposium should help in opening up for further discussion, and to a wider audience, a subject which has been monopolized on the one hand by economists, and on the other hand by sociologists. It clearly has much wider interdisciplinary impact and should be of interest also to political scientists, demographers, and psychologists on the one hand, and to ecologists and natural scientists on the other hand.

An example of a problem area where a quality of life index would be all-important is for the formulation of governmental policies related to population. Consider, for example, the apparently simple-minded question: Will we be better off with a larger or smaller population? And then try to justify your answer by some quantitative reasoning. Such an exercise should impress on us the need to construct an index—in spite of all doubts and difficulties—and provides the rationale for the symposium.

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28 December

Engineering—For the Survival of Man

This program, arranged by the Philadelphia section of the American Institute of Aeronautics and Astronautics, will be held in two sessions.

The morning session will be concerned primarily with educational aspects of engineering. The dean of a university engineering department will describe directions he is taking to ensure relevance in courses offered. The manager of a research and development laboratory will describe the kind of engineering training most useful to accomplish R & D objectives. A university director of a new center will give those guidelines that this center will follow to provide the skilled manpower needed to cope with the critical social and technological problems expected to develop over the next decade in the nation's utilization of energy. A period of discussion among the panel of speakers and between the panel and the audience will be scheduled.

The afternoon session will cover some current applications of engineering efforts directly involved with contributing to the welfare of man. Specific applications, such as the earth resources satellite and urban forms of new transportation modes, will be described; the "systems engineering" approach also will be covered. Finally, the program will conclude with a presentation quite fitting for an AIAA session, "Will Space Exploration Help Man Survive on Earth?"

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