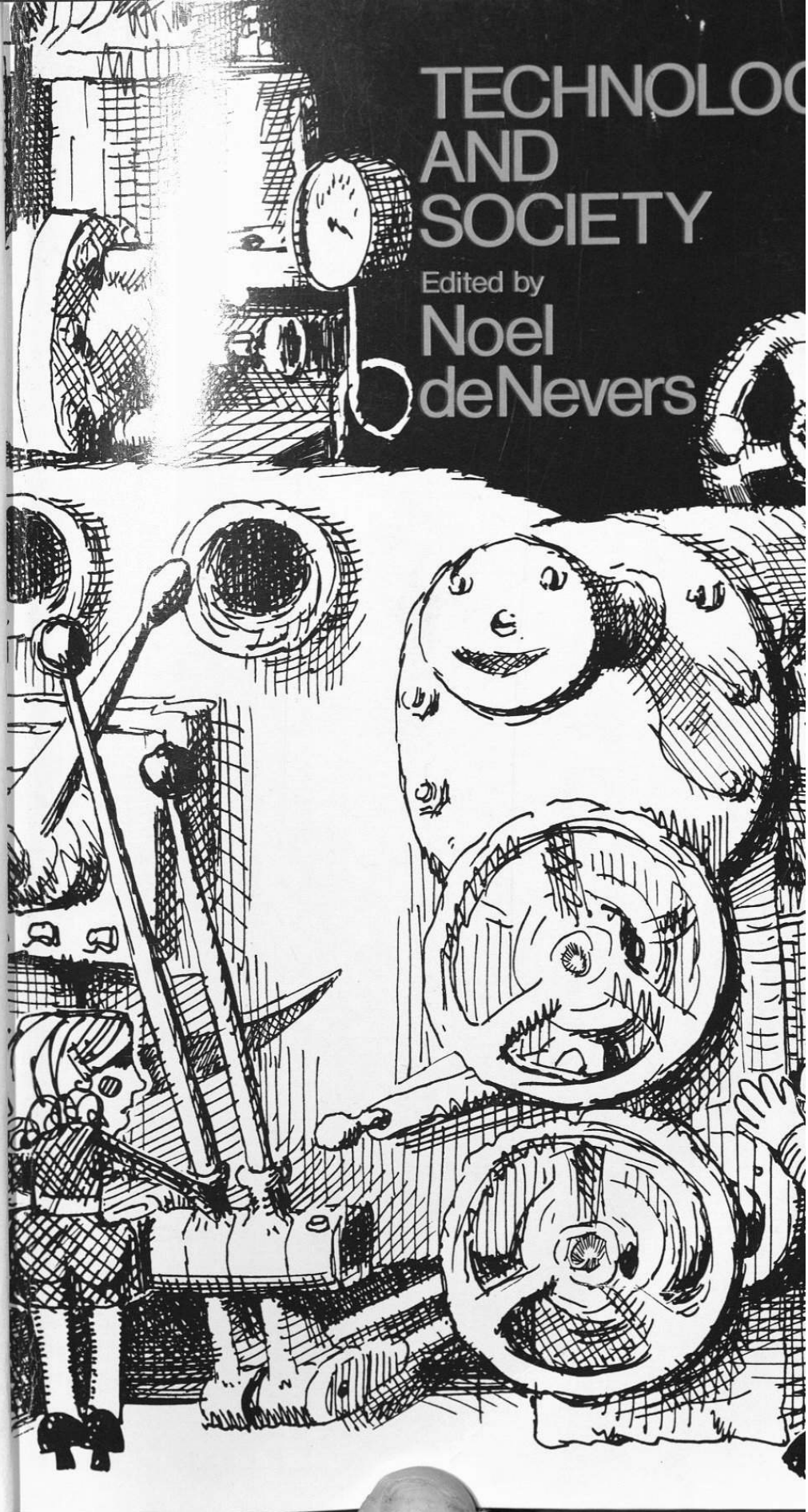
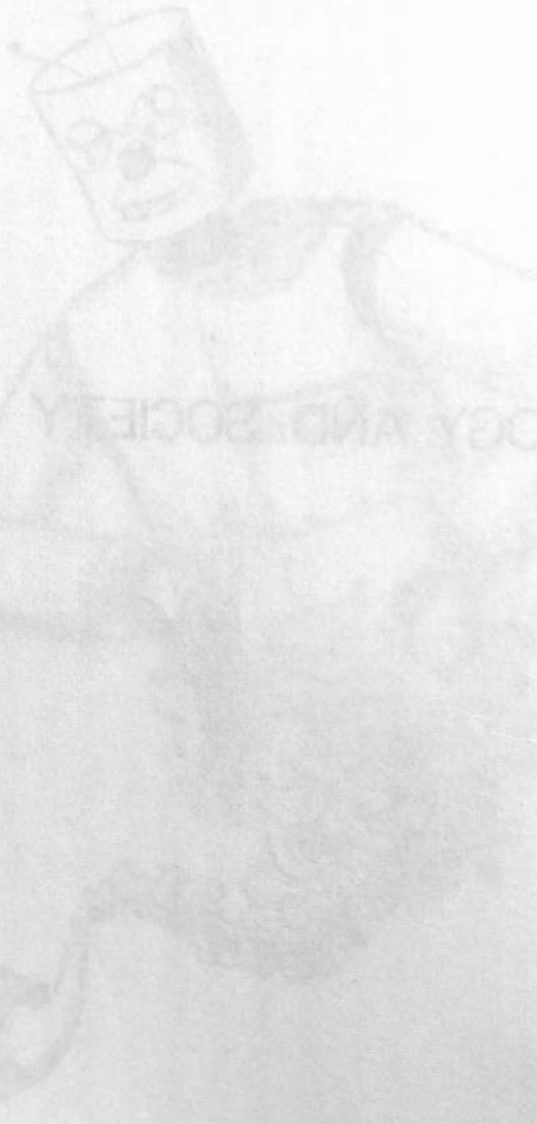
TECHNOLOG AND SOCIETY

Edited by

Noel de Nevers





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Preface

In the last few years in this country there has been a growing awareness on the part of the public that ours is a technological society and that our technologies influence our lives. This awareness seems to have begun before the current outburst of interest in environmental problems, but the interest in technology and in environmental problems frequently coalesces into a single interest. As a response to this increased interest, the College of Engineering of the University of Utah has developed a course about technology. This course is open both to students in science and engineering and students in arts and humanities; the material presented is equally accessible to both groups. The purpose of the course is to introduce these students to the problem of technological change and its effect on our society, and to give them some perspective on the history of technological change and the role of technological change in shaping our lives.

This course development program was funded by the National Science Foundation through Science Curriculum Improvement Grant No. GY-6386. The principal organizer of the course was Noel de Nevers. Others who have taught the course, using these materials, and provided helpful comments are: Abraham Sosin, Seymour Hammond, Joseph Andrade, LaMont Tyler, and Edmund Fitzgerald.

The course is open to all students from freshmen through seniors. The chief participants have been freshmen who take it as one of the electives in the general education program at the University of Utah. The typical class size of 50 to 70 students works well with this reading-and-discussion course.

There is a relatively extensive reading list, consisting of books available in pocket book form and a set of readings which are reproduced for the course and distributed in a binder through the University Bookstore. For each reading, a set of discussion questions is handed out to the students. The class sessions consist of discussion led by the instructor on the material which has been read. Tests are all of the essay type.

This book contains the set of short readings which have been used in the course, plus the discussion questions both for these readings and for the pocket books which constitute the main readings. In addition there are short introductions to each topic, and a list of suggestions for further research and discussion for each topic.

The paperback books which are regularly included in the course, and for whi discussion questions are included herein, are:

Aldous Huxley, *Brave New World,* Bantam, 1958 ed.

Lynn White, Jr., *Medieval Technology and Social Change,* Oxford University Pres 1962.

Elting E. Morison, *Men, Machines, and Modern Times,* M.I.T. Press, Cambridge, Mass 1966.

Paul R. Ehrlich, *The Population Bomb,* Sierra Club, Ballantine, 1968.

——, "Science and Technology and the Cities: A compilation of papers prepared fo the tenth meeting of the panel on Science and Technology, Committee on Science an Astronautics of the U.S. House of Representatives." Supt. of Documents, Washingto D.C. (1969).

Ralph Nader, *Unsafe at Any Speed,* Pocket Books, 1966.

C. P. Snow, *The Two Cultures, and a Second Look,* Mentor, 1963.

——, *Science and Government,* Mentor, 1960.

The material covered in this book contains seven topics. In a three quarter-hou course at the University of Utah we normally cover five of these. The choice of whic two to omit is left to the instructor.

August, 1971

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Contents

Topic 7 Science-Technology and Government

Introduction

The cartoon at the front of this book epitomizes a feeling which is prevalent in today's society, namely, that advancing technology has gotten out of control and is threatening the future of mankind. This view is a very recent one in man's history. The cartoon is specific in showing that the advancing technology has the face of the digital computer and the hands of the automatic transfer machines used in "automated" factories. These are two of the manifestations of technology which have received a great deal of public attention.

This book is intended to help the student learn why such fear of technology exists, what the background and the meaning of the fear are, and why the fear is prevalent now, rather than at some time in the past. To understand this fear, the student will have to learn something about technology, and our response to it. He must also learn about the problems which technological change causes. These problems are current and important. Our society has not yet found satisfactory answers to these problems, and the author presents no such answers here. Rather, the objective is to help the student learn what the important problems are, and why it is hard to find satisfactory solutions to them.

The book is divided into seven topics as follows: (1) the complaints about technology; (2) the history of technological change, the acceleration of technological change, and the transfer of technology; (3) how we respond to technological change; (4) the predictions of technological disaster; (5) how safe is safe enough?; (6) the interrelations of technology; (7) science-technology and government.

The book contains readings and discussion questions. For each of the seven topics there is an outside reading which is available in a short, inexpensive pocketbook. Discussion questions are provided for these outside readings and references are made to them in the discussion of the readings which appear herein; therefore, they should be considered an integral part of this book.

If the seven topics are covered in order they form a connected whole. The author hopes that when the student has worked through the material in this book he will have a reasonable grasp of what technology is, and how it affects our lives, and what the public policy questions concerning technology are. If he gains this knowledge he will be better prepared for his role as human being-citizen-participant in our society.

Topic 1
The Complaints About Technology

There is a large body of vociferous public opinion which takes the view that modern technological change is leading to very evil consequences. This opinion should be considered by anyone who regards himself as an informed human being.

Behind this current attack on our "technological society" is a second theme which is not as clearly expressed, but is just as significant. This is the theme that industrialization and mechanization of life is basically evil and diverts man from his "natural" state. This theme goes back at least as far as Rousseau and possibly even further.

A third theme which seems to be interwoven with these complaints is the theme (going back at least as far as Aristotle) that the mechanics of providing the material needs of mankind are basically sordid and that those who provide these needs are inferior people.

These three themes are interwoven in the material presented in this section. At times it is difficult to differentiate them one from another. However, there has been a significant increase in volume of this kind of criticism in recent years. The criticisms of Aristotle and Rousseau have been with us for a long time and have attracted relatively little attention. However, in modern times many more observers of our society have become aware of the effects of technology and technological change and have raised their voices in the kinds of criticisms discussed here. The objective of this section is not to answer these criticisms or to make a full analysis of possible answers, but rather to introduce the student to this body of criticism and use it as a way of introducing the other materials in the course. By the end of the course the student should make up his own mind as to the validity of the criticisms presented in this section.

Taking these themes in reverse order, we begin with several quotations from Aristotle which appear in his "Politics" (Loeb Classical Library, London 1932).

". . . . it is therefore clear from these considerations that in the most nobly constituted state, and the one that possesses men that are absolutely just, not merely just relative to the principle that is the basis of the constitution, the citizens must not live a mechanic or a mercantile life (for such a life is ignoble and inimical to virtue), nor yet must those who are to be citizens in the best state be tillers of the soil (for leisure is needed both for the development of virtue and for active participation in politics)." (Page 575)

"And it is also manifest that the properties must belong to these classes, inasmuch as it is necessary for the tillers of the soil to be slaves, or serfs of alien race." (Page 577)

"It is therefore not difficult to see that the young must be taught those useful arts that are indispensably necessary; but it is clear that they should not be taught all the useful arts, those pursuits that are liberal being kept distinct from those that are illiberal, and that they must participate in such among the useful arts as will not render the person who participates in them vulgar. A task, and also an art or a science, must be deemed vulgar if it renders the body or soul or mind of free men useless for the employments and actions of virtue. Hence we entitle vulgar all such arts as deteriorate the condition of the body, and also the industries that earn wages, for they make the mind preoccupied and degraded. And even with the liberal sciences, although it is not illiberal to take part in some of them up to a point, to devote oneself to them too assiduously and carefully is liable to have the injurious results specified." (Pages 638-9)

Needless to say, these ideas are repulsive to most engineers. This viewpoint of what is right and proper was entirely feasible for a man who lived in a society where all manual labor was conducted by slaves. One can have a very lofty and refined view of what is right and proper for human beings as long as someone else does all the physical work. These quotations are cited to show that in many of the readings which follow the suggestion is really made that those who do not "dirty their hands" with the real running of our society are the only ones who are qualified to speak upon what is good and right. Engineers take a very hostile view of this idea.

The second theme is shown in this quote from Rousseau's "Discourse on Inequality."

"As long as men remained satisfied with their rustic cabins; as long as they confined themselves to the use of clothes made of the skins of other animals, and the use of thorns and fish-bones, in putting these skins together; as long as they continued to consider feathers and shells as sufficient ornaments, and to paint their bodies of different colors, to improve or ornament their bows and arrows, to form and scoop out with sharp-edged stones some little fishing boats, or clumsy instruments of music; in a word, as long as they undertook such works only as a single person could finish, and stuck to such arts as did not require the joint endeavors of several hands, they lived free, healthy, honest and happy as much as their nature would admit, and continued to enjoy with each other all the pleasures of an independent intercourse; but from the moment one man began to stand in need of another's assistance, from the moment it appeared an advantage for one man to possess the quantity of provisions requisite for two, all equality vanished; property started up; labor became necessary; and boundless forests became smiling fields, which it was found necessary to water with human sweat, and in which slavery and misery were soon seen to sprout out and grow with the fruits of the earth.

"Metallurgy and agriculture were the two arts whose invention produced this great revolution. With the poet, it is gold and silver, but with the philosopher it is iron and corn which have civilized men, and ruined mankind . . ."

Basically this is the argument that only in the "state of nature," in which man supplied his wants by direct hunting, gathering, and so on, was man happy. No modern

scholars take Rousseau very seriously. Certainly the observation of current primitive tribes does not indicate that their life is as idyllic as he believed. However, this theme also persists through the other writings discussed in this section. The harkening toward the golden age when men didn't dirty their hands with mechanical contrivances is a strong one.

First Reading

Aldous Huxley, *Brave New World*, Bantam Paperback Edition, 1958. *Brave New World* is a science-fiction story set 700 years in the future. In it a world government has taken over the complete direction of all aspects of the lives of the people. In this world, pain, suffering, want, and hardship have been completely eliminated, but at considerable cost in individuality. The story is set in England; an outsider, who by accident was raised on an Indian reservation and learned about England through the collected works of Shakespeare, comes into the society. His conflict with the "brave new world" is the vehicle Huxley uses for showing the problems of a world in which we have sacrificed individuality for material comfort.

Brave New World was first published in 1932; in it Huxley points to problems which others are only beginning to see now.

DISCUSSION QUESTIONS

1. What, in 50 words or less, is the basic message of this book?
2. Does Huxley have a positive, negative, or neutral attitude toward the "brave new world" he pictures?
3. One of the major areas of conflict between Savage and Lenina is over their different concepts of self-denial and the need for suffering. Huxley is suggesting that technological advance will make possible instant gratification of all physical desires, and make labor and pain unnecessary. Assuming he is right, would you vote for such a situation? Or do you agree with Savage that this would degrade you?
4. In the book is the position of the individual, as an individual, stronger or weaker than in our present society?
5. In which general areas were his predictions of technological change most speculative, i.e., farthest from current fulfillment? In which areas were they most conservative, i.e., of things which we have long since fulfilled? Is there an obvious reason for this difference?
6. In Chapter 12 (p. 119) is a passage beginning, "A new theory of Biology . . ." Some students say this is a parallel to the "grand inquisitor" section of *The Brothers Karamazov*, by Dostoyevski. Is it a good parallel? Is Huxley right in the parallel?
7. In Chapter 3 (p. 67) Lenina says, ". . . Progress is lovely. . . ." Is this a commonly held belief in the *BNW*? Is it consistent with the other beliefs and policies of the rulers of *BNW*?

8. Why did Huxley pick Ford as the new god? Whom would he pick if he were writing today?
9. Why is there the strong emphasis on consumption of material goods in the book, e.g., the comments on page 33?
10. On the bottom of page 125, Helmholz shows his complete inability to comprehend the Romeo and Juliet story. Why cannot he comprehend it?

Second, Third, and Fourth Readings

Three magazine articles follow, in which current writers raise and discuss the complaints against technology. These are given without individual introduction; a set of discussion questions follows each one.

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