attempt to break a new path, I agree with not one jot of it, and I commend to the reader the works of philosophers, from the time of Mill and later, who have tried different paths through the wilderness: William Whewell, C. S. Peirce, Stephen Toulmin, P. K. Feyerabend, Michael Scriven, Hilary Putnam, the late Norwood Russell Hanson, and many, many others.

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Tools on a Grand Scale

Technological Change. Its Impact on Man and Society. EMMANUEL G. MESTHENE. Harvard University Press, Cambridge, Mass., 1970. 128 pp. $4.95. Harvard Studies in Technology and Society.

Mesthene is the director of the Harvard University Program on Technology and Society, a well-financed and ambitious enterprise which is presumably beginning to approach completion. One might expect, therefore, that this little volume would be a kind of interim report. It has a little of that quality. Mainly, however, it is a personal essay, reflective rather than empirical, on the impact of technical change on society, its possible evaluation, its impact on values and religion, and on economic and political organization. The essay indeed is short, comprising as it does only about 75 small pages, a considerable part of the volume being taken up by an excellent annotated bibliography. The word that most immediately comes to mind in describing it is "Emersonian." It has the judicious, rather lofty quality of Emerson's essays, and at the end of it one has the same slight feeling of emptiness. The great god Technology turns out to be neither all good nor all bad and indeed frequently overrated, so that he looks at the end a bit like a Boston-Unitarian Thor who hardly seems worth all the excitement. This, however, is a little unkind. There is a good deal of mature reflection in this book and it deflates gently a fair amount of popular nonsense on the subject. Technology is simply tools and ways of doing things. Social institutions are just "groups of people organized in certain ways to accomplish certain purposes" (p. vii), so there is no great mystery about all this and one wonders almost whether the question was worth studying.

By defining technology as tools, however, Mesthene in effect defines away what may be the real problem at issue, which is the life that human artifacts seem to possess almost independent of man himself. A tool is something always under the control of the tool user. The very thing which disturbs so many people about the burgeoning evolution of human artifacts is precisely that this process seems to be getting out of control and to be taking on an evolutionary life of its own, using the totality of human nervous systems as the field within which this evolutionary process proceeds. One sees this gap between the tool concept of technology and the social evolution concept most clearly perhaps in Mesthene's treatment—casual, it must be admitted—of military technology, which he looks upon with a surprisingly benign eye. Thus, he describes on page 32 "our most spectacular technological successes in America in the last quarter of a century" as "in national defense, in space exploration, and in the provision of consumer goods and services. These successes have provided protection for the nation, realization of an age-old human dream, and achievement of the highest standard of living ever enjoyed by man." There is not much feeling here for the appalling instability of a system of nuclear deterrence which makes the probability of almost total destruction in the next 25 or 50 years dangerously high. There is no sense that the space enterprise has diverted desperately needed resources from other things or that the higher standard of living goes hand in hand with desperate pockets of poverty, inadequate medical care, racial discrimination, and students burning down their own universities. There is no real discussion of the effect of technology on identity, or on those all too fragile integrative structures which hold society together. In its political theory the essay seems to rely on what is to my mind the rather naive assumption that improved collection or processing of information from the ruled will improve decisions of the rulers. This greatly underestimates the difficulty of the conflict-resolution tasks of political organization, especially as we move toward an age of declining growth.

This essay was clearly written before Earth Week and it does not reflect much of the anxieties about ecology and resource use which have been so prevalent this year. There is an implied expectation that technology will continue to increase human power and productivity almost indefinitely, without regard to the limited capacities of the planet. However, this is a very brief essay and one should not complain that it does not cover everything. The slightly querulous tone of this review indeed may be a tribute to the power of this essay to stimulate reflections which go far beyond its actual content.

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Interdisciplinary Earth Science

Hot Brines and Recent Heavy Metal Deposits in the Red Sea. A Geochemical and Geophysical Account. EGON T. DEGENS and DAVID A. ROSS, Eds. Springer-Verlag, New York, 1969. xii + 600 pp., illus. $32.

This book is a compilation of research papers from a variety of geological and oceanographic disciplines. Its approach is, therefore, problem-directed rather than subject-oriented. The purpose is to bring to bear, on a single problem, a diversified array of techniques and scientific backgrounds. The result is a coverage and a tone that is strongly reminiscent of the Apollo 11 conference in Houston, and the approach is one that probably will be applied more in the future in attempts to unravel complex interdisciplinary problems whose importance justifies the efforts involved. An advantage of such a treatment is that it may provide the only satisfactory insights into certain types of problems; a disadvantage lies in the great demands it makes on the reader's competence as a generalist. The present volume has these characteristics.

A proper framework is established from which to consider the origins and significance of the Red Sea brines. The regional stratigraphy, tectonics, and probable geologic history of the Red Sea and adjacent land areas are carefully documented and described, and a similar treatment is given to the physical, chemical, and biological oceanography of the Red Sea. It is likely that many readers will find the book valuable as a source and bibliography on these subjects, even if they are not interested in the hot brines per se. Similarly, the description of sampling and analytical techniques utilized in the various investigations is a useful summary of methodology for many areas of earth science.

The location of the brine basins and