

## Book Reviews

**Man's Role in Changing the Face of the Earth.** William L. Thomas, Jr., Ed. University of Chicago Press, Chicago, Ill., 1956. 1193 pp. Illus. \$12.50.

This weighty volume (actually 5 pounds 9 ounces) contains the background papers for, and summaries of, the discussions which took place in June 1955 at Princeton, N.J., during an international symposium made possible by funds from the Wenner-Gren Foundation for Anthropological Research, Inc., the printing of the proceedings being aided by a grant from the National Science Foundation of the United States of America.

It is dedicated to George Perkins Marsh (1801-82), American statesman and scholar who in 1864 wrote of the need for caution in large-scale operations which modify the surface of the earth and suggested the importance of improvement of waste and exhausted regions (*Man and Nature*; or, *Physical Geography as Modified by Human Action*).

The symposium met at two sessions each of 6 days and was organized to consider, first, man's tenure of the earth, the subsistence economies, commercial economies, and the industrial revolution with the developing urban dominance; then, environmental changes through forces independent of man, man's effects on the waters of the earth, alteration of climatic elements, changes in soils through human use, modifications of biotic communities, ecology of wastes, and urban-industrial demands on land; followed by limits, as to materials and ideas, man's self-transformation, and the unstable equilibrium of man in nature; ending with a session for summary remarks by the three collaboration editors.

The magnitude and range of the work may be judged from the fact that 53 authors contributed background papers and 70 took part in the symposium. These were selected as thinking individuals from some 24 disciplines and ten countries.

A short review of such a wide-ranging work cannot do justice to any part of it, but reference may be made to a few selected points which leap to the eye. Only about ten generations separate us

from the beginning of the scientific revolution, but in this short space of time man has wrought such changes and has engendered such conditions that they challenge his continued existence. The so-called "Western world" is made up almost wholly of urbanized individuals who regard natural resources as exploitative and expendable in an era of "expanding prosperity," with little or no thought for responsibility in the rapidly closing frontiers of the world. It was recalled that Putnam, in his *Future of Energy* said that half of the coal which has been burned in the whole history of the world has been burned in the United States in the last 30 years. Undoubtedly fossil fuels, after this century, will cease to exist in a practical sense.

It was a good thing to have some members of older civilizations from maybe so-called "underdeveloped countries" take part in the symposium to provide a balance to some of the more mechanical, technologic ideas prevalent in our own lands. Naturally there is some variation in the quality of the papers, but the general standard is high, and the volume as a whole is so full of up-to-date and thought-provoking material that it will be an essential reference in every institution of learning.

B. T. DICKSON

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**Engineering as a Career.** Ralph J. Smith. McGraw-Hill, New York, 1956. 365 pp. Illus. \$4.75.

This book, designed to serve as a guide for a two-unit orientation course of approximately 32 meetings for freshmen engineering students, is organized in three parts: "The engineering profession," "College training of the engineer," and "The engineering sciences." It is also suitable for a three-unit course in which more emphasis is placed on problems, many of which are listed in nearly every chapter. For a one-unit course the author suggests minimizing or omitting the treatment of the engineering sciences.

It is my hope that no orientation course based on this book will completely omit the four chapters in this section,

which give the student previews of engineering materials and mechanics, steam power, internal combustion engines and refrigeration, electric circuits and machines, electronics, and engineering economy. This material should be very helpful in alleviating the common complaint of engineering freshmen that they "are not getting any engineering."

In the first five chapters of part one Ralph Smith develops and discusses definitions of *engineering* and *engineer* and gives an excellent brief history of engineering, a thoughtful discussion of engineering as a *profession*, and well-written descriptions of the major fields of engineering.

There follows a chapter, which is believed to be unique among orientation textbooks, devoted to a discussion of the *functions* of engineering. The author points out that, while *fields* of engineering (civil, electrical, chemical, and so forth) appeal to the engineer's *interests*, the *functions* of engineering (research, design, production, and so forth) are more closely related to his *aptitudes* and, hence, are "more meaningful from the standpoint of career planning." He then lists "in order of decreasing scientific emphasis" the major engineering functions of research, development, design, construction, production, operation and maintenance, application and sales, industrial, and management. He cautions that in industry various combinations of these functions are frequently found in the same department, or even in the same person. He then defines each function, discusses it in detail with illustrative examples, and lists desirable personal qualifications and type of training.

Included is a discussion of the "engineering spectrum," with a diagram indicating the relative extent to which each major function depends on each of the four major factors involved in engineering—namely, ideas (abstract scientific concepts and principles), things (machines, materials, structures, circuits), men (employees, associates, superiors, customers), and money (financing, costs, prices, profits).

This chapter should prove highly valuable to anyone who is responsible for the guidance of engineering students, but it seems regrettable that no mention is made of engineering teaching, a field of great and growing importance.

Also worthy of special mention are Chapter 7, which discusses the relative roles of the scientist, the engineer, and the technician as members of "the technical team," and Chapter 15 on the engineering method of problem solution. This chapter could well be used much earlier in the course than is indicated by its position in the book, especially if much use is to be made of problems.

The chapters on the economic status of

the engineer and the cost and value of a college education are provocative, although the teacher using the book as a textbook will do well to check the data presented, which change quite rapidly. Other stimulating chapters are those on "Oral and written reports," "Engineering drawings and graphs," and "Numbers, symbols, and mathematical tools."

On the whole this book, while it might be improved by certain rearrangements of material, is a valuable addition to the growing literature on the orientation of prospective engineers.

HENRY H. ARMSBY

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**The American Experiences of Swedish Students.** Retrospect and aftermath. Franklin D. Scott. University of Minnesota Press, Minneapolis, 1956. 129 pp. \$3.

Every year more than 30,000 foreign students come to the United States to spend some time in American institutions of higher education. The Social Science Research Council has launched a research program "that might lead to better understanding of the complex processes involved in cross-cultural education." The study reported in this book is part of this SSRC program. Franklin Scott has visited Sweden studying Swedes who have visited the United States.

Scott is an alert and sympathetic observer of Americans and Swedes, and his book is full of insights. One is a little disappointed, however, that the author has not utilized social-science methods more efficiently so as to bring his insights beyond the impressionistic stage. It is surprising to hear a social scientist say that "the study trip abroad is essentially an individual phenomenon which defies classification" and that "the simplest way to present the results would be through a series of biographical analyses." This would be to reject the challenge of science.

Fortunately, the reader is *not* presented with a series of unrelated case histories. Despite the quoted declaration, Scott does indeed set out to generalize as best he can, on the basis of impressions gained from extensive interviewing and reading.

Thus the Swedes are reported to be annoyed at the American university system, which does not allow the students the same degree of independence as do Swedish universities. (But even so, Swedish educational reforms are much influenced by American practices.) The Swedes are also indignantly commenting upon sex relations in America, which they characterize as "prime example of

American immorality and hypocrisy"; while Sweden "emphasizes the inevitability and naturalness of sex."

Comparing interpersonal relations more generally, the United States comes out best: "The Swedes . . . are accustomed to a frigid correctness of manners; the cheerfulness and easy friendliness of Americans show them a new way of meeting people, and make a universal appeal." Visiting Swedes are also impressed by American ability to work in groups; the following example illustrates the point almost too well: "In one Swedish community two research institutions exist almost side by side: one is dominated by an academic dictator and rent by bitterness; the other is led in cooperative spirit by a scholar who had participative experience in two of the best American research institutes, and its atmosphere is happy, its work effective."

These illustrations will have to suffice to indicate the flavor of the report. Although this may not be social science at its most advanced stage, it is interesting and suggestive reading.

SVERRE LYSGAARD

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**Engineering Mathematics.** Kenneth S. Miller. Rinehart, New York, 1956. 417 pp. Illus. \$6.50.

In this book the author has not tried to be encyclopedic but has made a coherent and useful selection from the possible topics. Apparently intended mainly for electrical engineers, the book meets the current standards of mathematical rigor for courses with a similar title at the junior, senior, and graduate levels. Thus, heuristic arguments are emphasized, and physical applications are often used to guide the mathematics. Certain mathematical niceties are included in the appendices. The major portion of the book is concerned with methods for the solution of linear ordinary and partial differential equations. The chapters on networks and random functions will doubtless be attractive features when the major emphasis in such a course is on linear equations. The book seems to be a sound and teachable treatment.

The chapter titles and comment thereon are as follows: "Determinants and matrices"; "Integrals. Introduction of special functions"; "Linear differential equations. Includes Green's function and series solutions"; "Fourier series and integrals"; "Laplace transform"; "Network theory"; and "Random functions."

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## New Books

*Advances in Cancer Research.* vol. 4. Jesse P. Greenstein and Alexander Haddow. Academic Press, New York, 1956. 416 pp. \$10.

*Metallurgy and Fuels.* Series V, *Progress in Nuclear Energy.* H. M. Finnieston and J. P. Howe. McGraw-Hill, New York; Pergamon, London, 1956. 805 pp. \$21.

*A World Geography of Forest Resources.* Edited for the American Geographical Society by Stephen Haden-Guest, John K. Wright, Eileen M. Teclaff. Ronald Press, New York, 1956. 736 pp. \$12.50.

*The Liassic Therapsid Oligokyphus.* Walter G. Kuhne. British Museum (Natural History), London, 1956. 149 pp. £4.

*The Great Chain of Life.* Joseph W. Krutch. Houghton Mifflin, Boston, 1957. 227 pp. \$3.75.

*Natural History of Birds.* A guide to ornithology. Leonard W. Wing. Ronald Press, New York, 1956. 539 pp. \$6.75.

*Heredity and Your Life.* An account of everyday human inheritance. A. M. Winchester. Vantage Press, New York, 1956. 333 pp. \$5.

*Pharmacognosy.* Edward P. Claus, Ed. Lea & Febiger, Philadelphia, ed. 3, 1956. 731 pp. \$12.50.

*Intercrossing among Pink Calla, White-Spotted Calla and Yellow Calla.* Ryohitsu Shibuya. The author, 1430 Grant Rd., Mountain View, Calif., 1956. 62 pp.

*Electronic Computers, Principles and Applications.* T. E. Ivall. Iliffe, London; Philosophical Library, New York, 1956. 167 pp. \$10.

*Straight to the Heart.* A personal account of thoughts and feelings while undergoing heart surgery. George Lawton. International Universities Press, New York, 1956. 347 pp. \$5.

*Mind and the World-Order.* Clarence I. Lewis. Dover, New York, 1956 (unabridged republication of ed. 1). 446 pp. Paper, \$1.95.

## Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, but to the publisher or agency sponsoring the publication.)

*Systematics of the Suborder Tubulifera (Thysanoptera) in California.* Publ. in Entomology, vol. 13. H. Edwin Cott. University of California Press, Berkeley, 1956. 216 pp. \$3.50.

*Mammals of the Anglo-Egyptian Sudan.* No. 3377. Proc. of the U.S. National Museum, vol. 106. Henry W. Setzer. Smithsonian Institution, Washington, 1956. 141 pp.

*Rabbits.* A subject bibliography. Special Bibliography No. 3. Laura I. Makepeace. Bibliographical Center for Research, Denver Public Library, Denver, Colo. 1956. 81 pp. \$2.

*Resources for the Future, Annual Report.* For the year ending 30 Sept. 1956. Resources for the Future, 1145 19 St., NW, Washington, 1956. 85 pp.