

globigerina ooze containing Eocene foraminifera, indicates a comparatively recent volcanic origin. Some time before the beginning of the Tertiary the volcanic mountain was truncated, and in the submergence that followed, the rate of sinking was too rapid for coral growth to keep pace. Therefore, no reef material accumulated as it did to a thickness of several thousand feet on the more slowly subsiding foundations of nearby Eniwetok and Bikini atolls.

There are a score of other contributions in this collection that are equally deserving of mention, but space is limited. Fortunately, the individual chapters can be obtained separately, and the title of each is sufficiently distinctive for a specialist to identify the ones most likely to be of interest to him. The range in price is wide, however, with a high of \$9.00 (for chapter a) and a low of 20 cents (for chapter s). The total cost (\$24.15) is likely to be too high for the average academician's already overextended book budget, or even for that of all but the most affluent institutional libraries.

The one element lacking in this stimulating collection of papers, I believe, is a section synthesizing the findings of the various contributors. This deficiency is remedied to some degree by Roger Revelle's foreword, but this is quite brief and was written largely before all the papers were published; it appeared in 1954, and chapters in this series continued to appear through 1959. The volume of material in this publication is too diverse and too highly specialized to be of general concern, yet the problem of coral reefs is of compelling interest, and a broad, comprehensive review of the findings of this 20th century expedition in terms of their relationship to past discoveries, to our present state of knowledge, and to the nature of problems still to be solved would have been most welcome.

The Geological Survey is to be congratulated on its excellent presentation of the results of this endeavor. The illustrations are of uniformly high quality, and the colored maps and charts of Bikini and other Marshall Islands atolls are superb examples of cartography; in fact, they are works of art in their own right.

The collating and publishing of this imposing accumulation of information of purely scientific interest is an achievement in the great tradition of the Survey's founders, notably such men as Powell, Gilbert, Dutton, and

Walcott. We can surely hope that an approach as successful as this one proved to be may establish a pattern to be employed more frequently in the future in a vigorous, wide-ranging series of investigations which may help us with the solution of the many riddles still confronting us about the nature of the earth and its past history.

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From Field to Factory. New industrial employees. James Sydney Slotkin. Free Press, Glencoe, Ill., 1960. 156 pp. \$4.

The central purpose of this study is to place the problem of labor in economic development (or, better, the problem of recruiting labor for industrialization) within a context of cultural anthropology. While the author is concerned with the problem of developing an anthropological theory about recruiting and committing labor in the underdeveloped areas now undergoing or about to undergo industrialization or modernization, he has not developed a series of interrelated propositions about this process.

What is of particular value in the study is the spelling out of a number of cultural factors that affect the industrialization process, but the propositions about the process are at such a high level of abstraction that they add little to the theoretical literature on industrialization or culture change written from other perspectives. In fact, the theory of culture change has advanced considerably beyond the framework of acculturation which is heavily used by Slotkin, and it is somewhat more sophisticated than is apparent from such conclusions as, "When a culture becomes inadequate in providing desired goods and services industrialism is adopted voluntarily" (page 143). It has long been known that cultures are particularly prone to change under stress, but just what combination of conditions are most favorable for initiating the industrialization process in underdeveloped areas is not apparent from this study. As a first step to a general theory, however, the work is of value.

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Science and State Government. A study of the scientific activities of state government agencies in six states. Frederic N. Cleaveland. University of North Carolina Press, Chapel Hill, 1959. xvii + 161 pp. Illus. \$3.50.

As an "interpretive summary" of the findings of reports on scientific activities in state government, this small volume tells the determined reader more than he wants to know and, possibly, more than he needs to know. It is long on fact, short on analysis and opinion; this is not always a virtue.

In 1954 the National Science Foundation contracted with the Institute for Research in Social Science at the University of North Carolina for a systematic study of science as a function of state government. Six states—California, Connecticut, New Mexico, New York, North Carolina, and Wisconsin—were selected as representative in their diversity. Using a common research design, teams of researchers converged on each of the states. The final reports afforded the basis for a statistical summary of the essential data by the National Science Foundation [*Scientific Activities in State Governments, Summary Report on a Survey Fiscal Year 1954* (Government Printing Office, Washington, D.C., 1958)].

Presumably this is the final effort to extract the last ounce of benefit from the reports, which must have been costly both in dollars and research travail.

If there is a "profile" of science in the six states, it is extremely fuzzy and indistinct. Indeed, the recitation of statistical differences tends to obscure the common features of scientific activity as a function of state government. There are common features—and significant ones—in the relationship of science to state government. But these are, perhaps, the ones least susceptible to analysis and appraisal by objective data.

Several observations are in order. First, the notion of shared responsibility between the federal government and the states in scientific activity is extravagant nonsense. The big money comes from Washington; the pattern and pace of government research effort is determined in Washington, whether in research on agriculture or on mental illness. Second, it is doubtful whether support for science in state government is "big business," as the author suggests. Less than 2 percent

of the state budget is expended in any of the six states for research; this is hardly impressive. Third, scientific activity in the states reflects the traditional obsessions, notably the heavy emphasis on agricultural research and on applied research generally. Perhaps the states may be "chasing the wrong rabbits"; research on urban redevelopment, housing, and smog may be more urgent than the search for new varieties of rust-resistant wheat. Fourth, the talents of researchers at the state university are rarely mobilized to bear on the crucial problems of a state. New Mexico, for example, needs a major, long-range research program on arid lands. The fact, cited in this study, that New Mexico puts the highest percentage of money into this kind of research obscures the central truth—namely, that the research effort is weak, thin, and uncoordinated, and falls far short of the need.

As a free people we have been content for the most part with a *laissez faire* philosophy regarding science. Our ideal is the researcher left to his own devices, pursuing his own interests. Perhaps it may not be inappropriate to suggest that scientific manpower resources can be mobilized in the cause of freedom without sacrificing the essential freedoms of the investigator. Whether at the federal or the state level, it is plain that this is the great challenge to science and public policy in our time.

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Mathematical Methods and Theory in Games, Programming, and Economics. vol. 1, *Matrix Games, Programming, and Mathematical Economics*. x + 433 pp. vol. 2, *The Theory of Infinite Games*. xi + 386 pp. Samuel Karlin. Addison-Wesley, Reading, Mass., 1959. Illus. \$12.50 each.

Although there are several good books on game theory, none matches this set in completeness of exposition. These volumes present a thorough discussion of the essentially noncontroversial parts of the subject. Included in the first volume are a survey of discrete matrix games together with practical computational methods, the theory of linear programming, some results in nonlinear programming, and chapters

on applications to economics. The second volume is concerned with continuous games, including the several classes of readily solvable ones, and games of timing.

Karlin writes with a high degree of rigor that demands close attention from the reader; many fascinating problems are worked in detail. The price of these volumes can only be called breath-taking.

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Plant Pathology. Problems and progress, 1908–1958. C. S. Holton, G. W. Fischer, R. W. Fulton, Helen Hart, S. E. A. McCallan, Eds. University of Wisconsin Press, Madison, 1959. xix + 558 pp. Illus. \$8.50.

This book contains 51 papers that were presented at the 50th anniversary meeting of the American Phytopathological Society. The papers, prepared by well qualified foreign and American scientists, embrace most of the broad field of plant pathology.

The first seven papers were major addresses devoted to the history and development of the science of plant pathology and to the history and development of the society.

The other 44 papers are arranged in nine groups corresponding to the symposia at which they were presented: (i) physiology of parasitism; (ii) genetic approach to elucidation of mechanisms governing pathogenicity and disease resistance; (iii) fungicides; (iv) chemistry of fungicides; (v) soil microbiology and root disease fungi; (vi) concepts and problems of nematology; (vii) structure of viruses; (viii) multiplication of plant viruses; and (ix) epidemiology of plant diseases.

These well prepared papers give a comprehensive summary of the present state of knowledge of the various segments of plant pathology. They are well documented, and each one includes an extensive list of pertinent literature citations.

This book gives a well-balanced review of the past and present state of plant pathology, and it will be a valuable reference book for teachers, research workers, and students.

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Reprints

Adventuring with Beebe. Selections from the writings of William Beebe. Viking Press, New York, 1960. 282 pp. \$1.25. The selections, covering more than 40 years and ranging from Bermuda to British Guiana and the Pearl Islands, deal with varied wildlife from black inchling fish to 35-foot whale sharks.

Animal Camouflage. Adolf Portmann. Translated by A. J. Pomerans. Univ. of Michigan Press, Ann Arbor, 1960 (*Tarnung im Tierreich*, Springer, Berlin, 1956). 111 pp. \$1.95.

The Ants. Wilhelm Goetsch. Translated by Ralph Manheim. Univ. of Michigan Press, Ann Arbor, 1960 (*Die Staaten der Ameisen*, Springer, Berlin, ed. 2, 1953). 173 pp. \$1.95.

The Birds. Oskar Heinroth and Katharina Heinroth. Translated by Michael Cullen. Univ. of Michigan Press, Ann Arbor, 1960 (*Aus Dem Leben Der Voegel*, Springer, Berlin, ed. 2, 1955). 181 pp. \$1.95.

Caves of Adventure. Haroun Tazieff. Translated from the French by Alan Hodge. Viking Press, New York, 1960. 222 pp. \$1.45. An account (originally published in 1953) of an expedition into the labyrinth of caves 2000 feet underground in the Pyrenees.

The Chemical History of a Candle. A course of lectures delivered before a juvenile audience at the Royal Institution. Michael Faraday. William Crookes, Ed. Viking Press, New York, 1960. 122 pp. \$0.95.

Crucibles: The Story of Chemistry. From ancient alchemy to nuclear fission. Bernard Jaffe. Fawcett Publications, Greenwich, Conn., 1960. 240 pp. \$0.50.

Ebb and Flow. The tides of earth, air, and water. Albert Defant. Translated by A. J. Pomerans. Univ. of Michigan Press, Ann Arbor, 1960 (*Ebbe und Fult des Meeres der Atmosphäre und der Endfeste*, Springer, Berlin, 1953). 121 pp. \$1.95.

Engineers' Dreams. Willy Ley. Viking Press, New York, 1960. 240 pp. \$1.25.

The Foreseeable Future. Sir George Thomson. Viking Press, New York, 1960. 166 pp. \$0.95. This book, written in 1955, deals with the future of technology.

Light, Visible and Invisible. Eduard Ruechardt. 201 pp. Translated by Frank Gaynor. Univ. of Michigan Press, Ann Arbor, 1960 (*Sichtbares und Unsichtbares Licht*, Springer, Berlin, ed. 2, 1952). 201 pp. \$1.95.

Men of Medicine. Katherine B. Shippen. Viking Press, New York, 1960. 220 pp. \$1.25.

El Origen de las Especies por Medio de la Selecccion Natural. vols. 1 and 2. Carlos Darwin. Estudio preliminar de Juan Comas. Universidad Nacional Autonoma de Mexico, Mexico, 1959. vol. 1, 276 pp.; vol. 2, 296 pp.

Planet Earth. Karl Stumpff. Translated by Egon Larsen and Frank Pickering. Univ. of Michigan Press, Ann Arbor, 1960 (*Die Erde als Planet*, Springer, Berlin, 1955). 191 pp. \$1.95.

The Sun. Translated by A. J. Pomerans. Univ. of Michigan Press, Ann Arbor, 1960 (*Die Sonne*, Springer, Berlin, 1957). 160 pp. \$1.95.