and from work done by himself and others since 1940, on the other. The result is a beautifully organized and complete record, with the original data clearly separated from the author's scheme of interpretation.

Wedel is more than a supremely competent archeologist; he is one of the rare students of the interrelationships of man and environment who can separate fact from fancy. Beginning with a study of natural environment and climate in Kansas, he proceeds to a thorough examination of documentary data on the known tribes of Kansas: the Kansa, Osage, Pawnee, Wichita, Plains Apache, Kiowa Apache, Kiowa, Comanche, Cheyenne, Arapaho, and Padouca. In historic times some of these tribes were purely bison hunters, some were agriculturalists, and some combined these economies. As in most parts of the United States, it is difficult to relate certain tribes to the archeological past, but Wedel handles these problems with his usual consummate skill.

Thus, whether the author is discussing the purported association of artifacts with the Pleistocene fauna at Russell Springs, the ceramic or agricultural complexes which may be related to eastern "Woodland" cultures, or the problems of identifying historic "Quivira" and "El Cuartelejo," we see the same careful sifting of evidence and lucidly stated opinions, not to mention his greatly detailed descriptions of the sites he personally excavated.

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Information Processing. Proceedings of the International Conference on Information Processing, UNESCO, Paris, 15–20 June 1959. Oldenbourg, Munich; Butterworths, London, 1960 (order from UNESCO Publications Center, New York). 520 pp. Illus. $25.

This conference, the first international conference devoted to information processing, was sponsored by UNESCO, and it brought together approximately 2000 experts on computers and information processing, representing 39 countries. Howard Aiken, the director of the computation laboratory at Harvard University, was president of the conference; Pierre Auger served as the secretary-general.

The papers and symposia at the conference were on subjects in the following categories: methods of digital computing; a common symbolic language for computers; automatic translation of languages; pattern recognition and machine learning; logical design of computers; and computer techniques of the future.

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The Biology of Marine Animals. J. A. Colin Nicol. Interscience, New York, 1960. xi + 707 pp. Illus. $14.

Although the theme of this book is ecological, its content is mainly physiological. It is concerned with the physiology of the solutions made by marine animals to the problems presented by their environment.

The introductory chapter summarizes the properties of the marine environment which impinge upon vital processes. Most of the others deal with comparative physiology and, in arrangement and content, resemble Prosser's *Comparative Animal Physiology*. The two books have eight chapter titles that are almost identical.

Water, ions, and the *milieu interne* are taken up first, then respiration and digestive functions. Here, for example, although there is overlap with Prosser, Nicol's emphasis is more on feeding mechanisms and functional morphology, less on enzymes and intermediary metabolism.

A long section of three chapters is devoted to sensory physiology, transmission, and effector mechanisms. Pigments, color change, and bioluminescence are treated in the next three chapters.

Chapter 14 departs from comparative physiology to deal in a well-rounded way with associations. These are categorized as commensalism, symbiosis, and parasitism, but Nicol emphasizes that these are stages in a spectrum of relationships between closely associated organisms.

Finally, an account of skeletons, shelters, and special protective mechanisms is given. Here as elsewhere the discussion is in a phylogenetic framework which does not discriminate against marine vertebrates other than fishes.

All of the chapters are well documented reviews. References, mainly through 1956, are conveniently grouped with each chapter and occupy 80 pages or 12 percent of the book. A sample of 200 revealed 84 percent to be in English and 70 percent to be from British or American sources; only 1.5 percent were from the Japanese literature.

Specialists will doubtless find their own research areas slighted in favor of less exciting aspects of marine zoology. However, Nicol has attained a commendable balance of the various ecological aspects of comparative physiology; and the coverage conveys the fascination of observation and experiment to those for whom the book is mainly intended—young biologists making their first serious excursion to the sea and undergraduates specializing in marine zoology. However, even the brighter among these readers will find the book meaty. Knowledge of comparative morphology and general biology are expressly presumed, and some familiarity with the generic names of the better known invertebrates is helpful.

ALAN J. KOHN
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The Story of Engineering. James Kip Finch. Doubleday, Garden City, N.Y., 1960. xxvii + 528 pp. Illus. $1.45 ($1.65 in Canada).

The increasing popularity of books dealing with the history of engineering and technology is pointed up by the appearance of this paperback original (meaning that there is no hardback edition). In this book, 200,000 words of text and 32 pages of nicely lithographed illustrations are used to tell the story of the construction of all kinds of structures and machines from the earliest times, in Egypt and Mesopotamia, nearly to the present, in Western Europe and the United States.

James K. Finch, Renwick professor emeritus of civil engineering and retired dean of the school of engineering at Columbia University, has for many years pursued as an avocation the study of engineering history; he has published one other book, *Engineering and Western Civilization* (1951), and numerous articles on various aspects of the subject. He is one of a very few engineering teachers who have found interesting and relevant the history of their profession

and who, in the absence of an established academic niche for the subject, have been crying in the wilderness of professional indifference. By way of contrast, the history of science and the history of medicine are recognized and active fields of study.

An enormous amount of material has been crammed into this book, and the thread of narrative is sometimes difficult to keep in sight. However, the very neglect of the field, which the author has been working to set aright, is an important part of the reason for this situation. The detailed monographic studies that are essential if anyone is to write a readable, well-knit, comprehensive history of engineering simply do not exist.

It is to be hoped that many scholars will discover through Finch's writing some of the possibilities of this fertile and exciting field of study, and that a mature and respected discipline of engineering history eventually will rise as a monument to his pioneering work.

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Immediate and Low Level Effects of Ionizing Radiations. A. A. Buzzati-Traverso, Ed. Taylor and Francis, London, 1960. xii + 381 pp. Illus. $8.

This volume, the proceedings of a symposium on the effects of low-level irradiation which was held in Venice in June 1959, is a valuable continuation of the symposium volume on low-level irradiation edited by A. M. Brues and published by the American Association for the Advancement of Science (1959). The Venice presentations give important new information in this steadily growing field; both the papers and the discussions that follow are worthwhile reading. Space does not allow a detailed evaluation of the many aspects covered in the papers, but study of the volume can be highly recommended to those who are interested in the field.

The symposium was held under the joint sponsorship of UNESCO, the Comitato Nazionale per le Richerche Nucleari of Italy, and the International Atomic Energy Agency.

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Social Change. H. Ian Hogbin. Watts, London, 1958; Humanities Press, New York, 1960. viii + 257 pp. Illus. $4.50.

In this expanded version of the Josiah Mason lectures delivered several years ago at the University of Birmingham, Ian Hogbin, an Australian anthropologist, examines a variety of conditions inducing social change. The emphasis is upon historically observed changes now taking place among primitive peoples, with examples drawn from the anthropological literature and from the author's own field work among Pacific Island natives. As a contribution to a general theory of social change, which it makes some claim to being, the book is handicapped by the anecdotal method that chooses random examples rather than systematic and controlled comparisons. In addition, it suffers from the drawbacks of the British functionalist theory, a theory that has been traditionally of a nonhistorical nature.

The real merit of the book lies in its perceptive analysis of many instances of acculturation, each illustrating some important aspect of change. Hogbin's discussion includes such matters as the effects of a money economy upon kinship, native resistance to latrines, the complex linkages of sorcery to social structure, and the pitfalls of administrative meddling in this sensitive area. He notes the unexpected ways in which natives interpret cherished European doctrines. As a striking instance of social chain reaction, he narrates how a single item of western culture, the steel axe, transformed the life of an Australian tribe. The examples document the basic interrelatedness of social institutions, customs, and values. The conclusion is obvious: If change in a society is to be administered with regard for consequences, the society must be understood in its entirety.

Change, the author recognizes, is inevitable and every social order must face the prospect of extinction. With knowledge, better social orders may be planned. From the native point of view, however, our best intentions may seem arbitrary. As one Melanesian told Hogbin, "In olden days we behaved as our fathers did before us. The white man has come and tells us we must behave like his father."

IRVING GOLDMAN
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Nutrition animale. vol. 2, *Données générales*. Part 1, *Métabolismes et transits*. H. Le Bars, H. Simmonet, and R. Jacquot. Baillière, Paris, 1960. ii + 490 pp. Illus. NF. 50.

Part 1 of the second volume of this encyclopedic treatise on animal nutrition covers the metabolism of water and nutrients in the animal body. The broad coverage actually constitutes a comparative presentation of our present knowledge of the nutrition of higher animals including man. Herein lies the greatest value of the work and the reward for the serious student who has the patience and persistence to penetrate, under the guidance of the eminent authors, the difficult subject matter.

FRANCIS JOSEPH WEISS
Arlington, Virginia

New Books

Mathematics, Physical Sciences, and Engineering

Air Research and Development Command, Geophysics Research Directorate. *Handbook of Geophysics*. Macmillan, New York, rev. ed., 1960. 697 pp. $15. The *Handbook* was first published in 1957 for use by prime contractors of the Air Force; data obtained from satellite and rocket explorations, arctic expeditions, solar observations, and balloon flights were used in this revision.

Boley, Bruno A. and Jerome H. Weiner. *Theory of Thermal Stresses*. Wiley, New York, 1960. 602 pp. $15.50. Chapters 1–4 cover the fundamentals of thermoelasticity; chapters 5–7 discuss the physical basis of the subject and methods of solving heat conduction boundary-value problems; chapters 8–13 cover practical aspects, mainly form the viewpoint of strength of materials; chapters 14–16 discuss the manner in which temperature effects can be included in inelasticity theory.

Bunshah, Bointan F., Ed. *Transactions of the Vacuum Metallurgy Conference, 1959*. New York Univ. Press, New York, 1960. 222 pp. $7.50. Contains the papers presented during the conference sponsored by the Department of Metallurgical Engineering in cooperation with the Office of Special Service to Business and Industry of New York University, 1–3 June 1959.

Coy, Paul H. *Structural Analysis of "Unistrut" Space-Frame Roofs*. Part A, *Recommended Methods for Computation of Safe Roof Loads*; Part B, *Tables of Computed Factors to be Used in Safe Load Computations*. Univ. of Michigan Press, Ann Arbor, 1960. 267 pp.; 59 pp. 2 vols., $18.

Davids, Norman, Ed. *High Speed Testing*. vol. 1. Interscience, New York, 1960. 119 pp. $10. This symposium (held in December 1958), was the first in a series of symposia devoted entirely to high-speed