Webster, who refused to vote a single cent for the opening up of the American West because it would always be a howling wilderness and no use to anyone but savages. Edward Everett Hale, author of *The Brick Moon* (first mention of a manned Earth satellite, 1869), is correctly identified: "he later became the first, and doubtless the last, science-fiction writer to be chaplain to the U.S. Senate." And Clarke cannot ignore the recently appreciated fact that the leading early theorists of the liquid-fuel rocket and space mobility—Tsiolkovsky of Russia, Goddard of the U.S., and Oberth of Rumania—were each stimulated by a reading of Jules Verne's *From the Earth to the Moon* (1865).

Clarke is at his best in digesting the "first harvest" of gains in space science and technology during the past decade, despite the incorrect identification, in a picture caption, of the 20-nozzle Soviet booster for Gagarin's Vostok I as that of Sputnik I. His four sections of four chapters each contain the best available summary of scientific and imaginative theory regarding space potentials: Around the Earth; Around the Moon; Around the Sun; and Around the Universe. Collectively they offer a most persuasive rationale, at least to this reviewer, which may be rebutted only with difficulty by critics of the space venture, who might profit most by its reading.

The Promise of Space, Clarke freely admits, was calculated to help restore the long-term view to space mobility recently diminished by the initial cost of capital investment already made and by the temporary sublimation of the international "space race," which characterized the beginning of the space program and may not be required for the future. Clarke's message is clear enough: the U.S. space program, at least in its earlier days, was certainly prodded by "gusts of emotion."

Some of this criticism is valid; some in itself is emotion—understandably so, in the age of scientists who may see billions going into space when they cannot get thousands for their own pet projects. However, much is based on a total failure to grasp the long range implications of space flight. After all the lessons that the history of our age has given us, this failure is inexcusable; and to those who continue to make it, it may be disastrous.

Clarke suggests that every revolutionary idea—in politics, science, art, or whatever—seems to evoke three stages of reaction: (i) "It's completely impossible"; (ii) "It's possible but not worth doing"; and (iii) "I said it was a good idea all along." Whetner this volume will "smooth the transition" of astronautics from the second to the third stage in the United States, as Clarke intends, remains for the future historians to determine.

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Invertebrates

Chemical Zoology. MARCEL FLORKIN and BRADLEY T. SCHEER, Eds. Vol. 1, Protozoa. GEORGE W. KIDDER, Ed. xvi + 912 pp., illus., $38. Vol. 2, Porifera, Coelenterata, and Platyhelminthes. xx + 639 pp., illus., $29. Academic Press, New York, 1967–1968.

The editors in their introduction to this new series call attention to a principal problem encountered by the biochemist who attempts to extend his investigations to a variety of animal forms—namely, the scattered nature of the literature on the chemistry of the invertebrates. Providing a remedy for this situation constitutes the primary aim and principal justification for this new series.

Volume 1 does this very well indeed for the protozoa. A brief but adequate summary of protozoan taxonomy introduces the volume; it is followed by several chapters on the basic biochemistry of the protozoa, each of which surveys our present knowledge of the occurrence, nutritional requirements, and metabolism of a major class of chemical compounds. The chapter on low-molecular-weight nitrogenous compounds is both comprehensive and critical. The chapter on protozoan growth factors not only does ample justice to this topic but also discusses knowledgeably some of the problems encountered in attempts to cultivate protozoa. There are also adequate reviews of nucleic acids, lipids, and carbohydrates, but strangely enough there is no mention of the present status of our knowledge of protein biosynthesis among members of this phylum.

The remainder of the volume consists of reviews of more specialized aspects of protozoan biochemistry. There is a very welcome summary of the literature on the biochemical ecology of the protozoa and an interesting chapter on chemical aspects of membrane transport in protozoa, including a discussion of phagocytosis and pinocytosis. Chapters on carbohydrate accumulation and its relation to morphogenesis, on digestion and hydrolytic enzymes, on biochemical genetics, on the biochemistry of cilia and flagella, on the chemistry of host-parasite relationships, and on protozoan development complete the volume. The wisdom of including the rather lengthy chapter on protozoan development, which is devoted almost exclusively to morphology and contains only a smattering of anything which can be called chemistry, appears questionable, particularly since its inclusion must contribute to what is the one major fault of this book—its price.

Volume 2, which covers some of the lower invertebrates, utilizes essentially the same format as volume 1. Each phylum is introduced by a chapter on its taxonomy and general biology, followed by chapters devoted to the basic biochemistry of the group. Chapters on specialized aspects of the biochemistry of the phylum (luminescence, toxins, and so on) complete each section. About half of the volume is devoted to flatworms, with particular attention to parasite forms. The remainder of the book covers sponges, the coelenterates, and, very briefly, the mesozoa.

On the basis of these initial volumes the series can be highly recommended to advanced students and to investigators in both biochemistry and zoology.

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Paleopathology

Diseases in Antiquity. A Survey of the Diseases, Injuries, and Surgery of Early Populations. DON BROTHWELL and A. T. SANDISON, Eds. Thomas, Springfield, Ill., 1967. xx + 766 pp., illus. $39.75.

There has been an increasing interest in paleopathology in the past few years as new prehistoric skeletal populations have been described which contain pathologic specimens, and some of the recently developed techniques of medicine and anthropology have been applied to the examination of these remains. With an increasing emphasis on human genetics and demography, anthropologists are more inclined to consider prehistoric diseases and injuries as events affecting populations rather than individuals and to interpret them as selective forces acting upon continuously evolving breeding groups.

This impressive volume reflects this shift in emphasis in the interpretation