latest evidence from geodesy, gravity anomalies, and seismology, to the effect that the floors of ocean beds have never been terrestrial continents. The old naïve hypotheses of land bridges, made "to order," as easily as "a cook does pancakes" to quote Darwin's unbeatable remark, have been superseded by the now real possibility that continental blocks have shifted over the underlying layers. By means of studies on remanent magnetism in rocks, P. M. S. Blackett has proved that this has occurred with changes in latitude, but there is still no physical evidence that there have been changes in longitude, which would have been involved in the separation of North America from Europe and of South America from Africa. Paleobiogeography states unequivocally that there can be no question of contact between these continents since the Triassic.

Readers of *Tempo and Mode in Evolution, The Meaning of Evolution,* and *The Major Factors of Evolution* will find in this book the same crystal clarity of exposition, in thought-sequence and in language. They will realize that those great books represent a distillation of the quintessence of meticulous research, in the field and in the laboratory. The present book brings the reader a stage closer to the field and the bench and gives a more intimate insight into how the conclusions have been arrived at. Throughout, the indomitable and inimitable buoyancy (may I spell it "boyancy"?) of the author's spirit protrudes and sustains interest and curiosity, and, among the excellent diagrams, those labeled "Whence? When? What?" and "How to make a living in the Eocene (or now)" show that the author has enjoyed writing these essays almost as much as the reader will enjoy reading them.

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Astronomy

The Planet Uranus: A History of Observation, Theory, and Discovery. A. F. O'D. Alexander. Elsevier, New York, 1965. 316 pp. Illus. $12.75.

The Planet Uranus, by A. F. O'D. Alexander, is an excellent, descriptive treatise on the planet and its satellites. Compilation of this volume must have involved a tremendous amount of painstaking research on references from many countries. The book includes considerable obscure material of much value, which otherwise, in time, would probably be lost. In places the reading may become a bit tedious, but the organization of such a mass of significant material would impose a problem. It may surprise many astronomers to learn that so much difficult observational work was bestowed on the planet Uranus in the 19th century.

The aspects of Uranus and its system of satellites was more of a challenge than many investigators could meet. In the first place, Uranus was seen 22 times as a star before its nonstellar nature was recognized: ". . . the most amazing fact is that Lemonnier should have recorded Uranus as stars (in Aries) six times in nine days, four of them on consecutive days, without suspecting that he was confronted by a moving planet, 12 years before Herschel discovered it" (p. 89). It is also surprising that for so long a time Herschel considered his new-found body to be a comet, when the simple pattern of the Earth's parallactic motion indicated a distance far beyond the limit of visibility of any comet.

Uranus itself had many surprises in store. A few decades after its discovery, its orbital motion became intolerable, and this led to the discovery of Neptune, the eighth planet. Its satellites were faint, and astronomers strained to search for them. It had such a high tilt in its axis that its rotation was retrograde. It was unique in color. Its high albedo led to suspicions of self-luminosity. The markings on its disk were hard to see. Its angular size and polar flattening were difficult to measure. Lastly its spectrum contained strange, heavy absorptions.

Those who read the book should certainly read the preface first. The contents are divided into 27 chapters with appropriate titles and subtitles. Fifteen chapters contain a short "running abstract" which is very helpful to the reader. There are two full pages of bibliography and a 16-page well-organized index. The sources of material are well documented. Five pages are used to give the full titles of references cited and their abbreviations as used in the book. Ten beautifully reproduced plates and 20 diagrams are found in the book.

The book is particularly timely because Uranus will be in perihelion in 1966, and the plane of its equator will be edgewise to our view. This will permit astronomers to make the most effective measurements of polar flattening and spectrographic determination of its period of rotation in 84 years, because the other edgewise view will be two astronomical units further away. It is apparent that such measurements with the largest telescopes are urgent. It will also be the best time to watch for spots and belts. Many tables and statistics to aid the observer are given in the last chapter.

The Planet Uranus deserves a place in the personal library of every planetary astronomer (both amateur and professional) and in every observatory and university library.

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Protoanthropological Literature

Readings in Early Anthropology. J. S. Slotkin, Ed. Aldine, Chicago, 1965. xvi + 530 pp. $9.75.

In its compiler's view, this book is "simply a collection of odds and ends . . . . In no sense is it a history of early anthropology. . . . Instead . . . I have merely collected materials in reference to some of my personal interests, with little or no regard to its cultural context. Also, there are serious gaps." Nonetheless, as Sol Tax remarks in his foreword, this collection of readings is "important for historians of anthropology." This is so largely because, in abstracting and annotating the early literature, the late Professor J. S. Slotkin, who compiled this volume for his own understanding, concentrated on the main branches and questions of modern anthropology—namely, linguistics, physical anthropology, archeology, ethnology ("a study of the historical relations between cultures"), ethnography, and social anthropology ("the comparative study of cultures"). In the masterly essay that introduces the compilation and furnishes a general overview, Slotkin uses this framework to review the growth and convergence of anthropological thought and knowledge in Western Europe during the interval between the 12th to the 18th centuries.

Briefly, we have here a collection of excerpts from the early protoanthropological literature, unusual and perhaps unequalled in its range, qual-

ity, variety, and depth. These "readings" were culled, classified, and collated by Slotkin during several years of intensive study. They provide equally impressive testimony of his scholarship and of his deep concern with the historical foundations of anthropology in Western Europe. His untimely death prevented Slotkin from undertaking the history of social anthropology in which he planned to use these materials. In such a work, these excerpts and their themes could have been presented in their culture-historical and idealogical contexts, thereby revealing their dialectical relationships. In the present volume, the editor's terse comments and signposts often presuppose that the reader is well versed in the general history and context of Western social and philosophical thought during these centuries, and especially in its competing views of man, his origin, development, status, society, language, and culture.

Although this is an extremely handy and useful source book for students of anthropological history, and a most welcome addition to the growing literature in that field, it needs to be handled with care, for several reasons. First, the citations are, as Slotkin points out, removed from their intellectual and cultural context. Second, for reasons unknown, the Romans and Greeks are ignored. Slotkin restricts his selections to Christian writers, ignoring Herodotus, Plato, and Ibn Khaldun alike. Consequently the book documents the struggles of West Europeans to break free of the crippling mould that medieval Christian theology imposed on thought about the human condition, but, by omitting the Greeks and Roman, Slotkin cuts off the Renaissance and the Enlightenment from their inspiration and source. The history of anthropology is part of the history of Western Europe, and in compilations of extracts much is inevitably lost because of lack of context. To get the most out of these readings, it is necessary to make the imaginative effort required to replace them in their contexts. Finally, anthropology is one of the youngest "sciences," and its development has always been conditioned by the state and progress of other older, and more advanced, sciences. Though many excerpts reflect and indicate this, these relations require special attention in tracing the evolution of the study of man.

The first two sections of excerpts—17 percent of the volume—deal mainly with the protoanthropological thought current from the 12th to the 16th century. These passages are almost wholly theological in their mode and terms, in contrast with the naturalism and rationalism that gradually dominate the contributions of the 17th and 18th centuries, which form 83 percent of the whole. It is particularly in its presentation of anthropological thought during the 17th and 18th centuries that this volume is of greatest value.

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Birth and Death of a Theory

Galaxies, Nuclei, and Quasars. Fred Hoyle. Harper and Row, New York, 1965. x + 160 pp. $3.95.

During July 1948, H. Bondi and T. Gold sent a manuscript entitled "The steady-state theory of the expanding universe" to the *Monthly Notices* of the Royal Astronomical Society. One month later, an independent formulation (which arose, however, from a discussion with Gold) was communicated to the same journal by Fred Hoyle. In the years that followed, Hoyle became the leading spokesman for what he termed the "New Cosmology," spreading the gospel of continuous creation through lectures, articles, and books (*The Nature of the Universe*, 1950; *Frontiers of Astronomy*, 1955; *Astronomy*, 1962). Considerable interest was therefore generated by press reports of an "Evening Discourse" delivered by Hoyle on 6 September 1965, in which he announced to the British Association for the Advancement of Science that the steady-state theory would "have to be discarded." As seen by most astronomers, the crushing blow to the theory was the number versus flux-density relation for extragalactic radio sources, determined by Martin Ryle who (like Bondi, Gold, and Hoyle) did his work at Cambridge University.

In *Galaxies, Nuclei, and Quasars*, Hoyle traces the developments in physics, astronomy, and cosmology that have so profoundly affected his view of the universe in recent years. The chapters "Galaxies" and "Radio sources," for example, call attention to the increasing body of evidence that identifies the giant elliptical systems as the sites of catastrophic celestial events. Hoyle now believes that these galaxies result from a process of expansion, while he retains the view that the flattened systems (spiral galaxies) are formed by condensation. The relevance to cosmology of high energy physics and nuclear physics is shown, respectively, in chapters called "X-rays, γ-rays, and cosmic rays" and "An outline of the history of matter." Of greatest interest, however, are the chapters entitled "The steady-state cosmology" and "A radical departure from the steady-state concept," in which the author develops his presently preferred model, a variation on the oscillating universe theory.

The book, which is based on lectures delivered at various universities, contains many stimulating ideas that will be of considerable philosophical interest to scientists. Its chief flaw is the failure to point out to the reader that the theories presented are generally not the prevailing ones. Further, the use of such terms as "very likely" (p. 146) and "inevitable" (p. 147) in speculative discussions is regrettable, especially on the part of the author who, as recently as 1962, rejected the oscillating universe model (*Astronomy*, pp. 299 and 300).

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Human Ecological Adjustments

Man, Culture, and Animals. The role of animals in human ecological adjustments. A symposium. AAAS Publ. No. 78. Anthony Leeds and Andrew P. Vayda, Eds. AAAS, Washington, D.C., 1965. viii + 304 pp. Illus. Prepaid to members, $7; others, $8.

The papers in this volume, some from a 1961 symposium and some added later, were not intended to test predetermined hypotheses but were an attempt to discover what regularities, if any, could be determined in the pattern of behavior of peoples who keep or use animals in various capacities, or depend on them for survival. Of the descriptive essays, eight are concerned with societies that possess