terns of vertebrates in the southern United States and shows how the patterns are explained by Pleistocene climatic and ecological changes, especially by southward shifting of climatic belts which split populations of warmth-adapted vertebrates and resulted in speciation in separate refuges in Florida and Mexico.

Under "General conclusions," Carl L. Hubbs notes the diversity of the papers that compose the book, the "emphasis on background considerations and on evolutionary and systematic correlatives" (but only within a very limited part of the world), the "kinetic approach" (which in fact began with Darwin), and the refined methods and high quality of many of the contributions (the praise is deserved). The editor notes also that biogeography is still a propitious field of inquiry, and that biogeographers show a [healthy] lack of preoccupation with transoceanic land bridges. However, real general conclusions—significant zoogeographic principles—are few in this book. Criteria for determining places or origin and directions of dispersal of animals are discussed, but no general conclusion is reached, except that tracing past histories is a complex and difficult matter. Several papers are concerned with the shifting of climatic zones, which (in North America) gradually moved southward (not northward, as Hubbs says inadvertently on page 473) during much of the Tertiary as the climate cooled, then pulsated violently during successive glaciations, complexly modifying plant and animal distributions. (No mention is made of Barghoorn's important paper, "Evidence of climatic change in the geologic record of plant life" [in *Climatic Change,* Harlow Shapley, Ed. (Harvard University Press, 1953)], which presents the evidence of southward shifting of climatic zones in North America from the middle Eocene to the Pleistocene.) Several contributors relate speciation to present distributions and past events in local situations, but the emphasis is on divergence of species rather than on evolution itself.

The broader aspects of zoogeography are missing in this book or, when touched, are not well handled. Donald E. Savage (pages 102–104) and Hubbs (page 473) dismiss the theory of Old World tropical origins of dominant vertebrates on the ground that much of the North Temperate Zone was tropical or subtropical in the earlier Tertiary. That the northern parts of the world were warmer in the Tertiary than they are now has been known by every competent zoogeographer since Darwin deduced it in 1858 (see Darwin's letter to Asa Gray in his *Autobiography* [Sir Francis Darwin, Ed. (Schuman, New York, 1950), p. 218]), although just how far north fully tropical conditions extended at particular times is still uncertain. But the shape and motions of the earth must always have caused some zonation of climate. The zonation has been enough to limit the sorts of mammals that have crossed the Bering land bridge at least since the late Eocene [see Simpson, *Evolution* (1947), vol. 1, pp. 218–220], and the distribution of dinosaurs suggests zonation in the Cretaceous. Moreover, even warm-temperature floras and faunas and fully tropical ones differ in more ways than just in being composed of different species. The tropical biotas are very much larger and more complexly integrated, and the species in them have different, sparser population structures. All this gives zoogeographers an opportunity not only to try to find where dominant animals have evolved in relation to climate but also, possibly, to discover fundamental things about the evolutionary process, about the situations and population-structures that influence it. That contributors to a symposium on local zoogeographic problems have missed this opportunity is not greatly to their discredit, but it brings us back to the point I started with. This book is a very good collection of papers on animal distribution (and some related subjects) chiefly in western North America, but it is not a zoogeography.

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American Voting Behavior. Eugene Burdick and Arthur J. Brodbeck, Eds. Free Press, Glencoe, Ill., 1959. iv + 475 pp. $7.50.

American Voting Behavior is a collection of some 22 essays mostly selected from four books each of which, in the opinion of Peter Rossi of the University of Chicago, represents a landmark in the research on voting behavior.

The four books he selects are *Quantitative Methods in Politics,* by Stuart Rice (1928); *The People's Choice,* by Paul F. Lazarsfeld, Bernard Berelson, and Hazel Gaudet (1944); *Voting,* by Bernard Berelson, Paul F. Lazarsfeld, and William N. McPhee (1948); and *The Voter Decides,* by Angus Campbell, Gerald Gurin, and Warren E. Miller (1954).

Most of the papers are written by sociologists and psychologists for sociologists and psychologists. The lay reader should arm himself with a glossary of terms currently popular among social scientists to be able to translate these contributions into understandable English. Agnes Meyer, one of the truly great students of social forces, has aptly described this contrived language as "desperanto."

The book would have much greater value if it were broader in scope. The contributors often reveal an amazing ignorance about election results and polling data and in some instances display an incredible naivete in their observations of voting behavior.

The contributors usually conform to the current ritual of social scientists by assiduously avoiding all conclusions except the inevitable one—namely, that "more research is needed before conclusions can be drawn."

A remarkable chapter was contributed by Leslie A. Fiedler of Montana State University. Fiedler, who is neither a sociologist nor a psychologist but a humanist, chides social scientists for "cloaking platitudes with a clinical vocabulary." He cites this example from *The Voter Decides*: "The results of both studies may be said to conform to the basic psychological principle that when strong and opposing forces act on an individual the resultant behavior will demonstrate the characteristics of conflict."

Some of the most interesting observations in the book on voting and voting behavior are offered by Fiedler. He wonders if it would not make more sense to characterize people by taste than by education, and he makes the very proper objection that in all of these studies there is not "sufficient prior speculation on the social meaning of the act of voting as such, opposed to the act of choosing one or another candidate."

We need to know more about voting behavior, and although this book confines itself to a small segment of this field, nevertheless it does demonstrate how the election process can be approached from the point of view of sociologists and psychologists. In this sense it is an important contribution to the scholarly literature in the field.

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History and Philosophy of Science. An Introduction. L. W. H. Hull. Longmans, Green, New York, 1959. xi + 340 pp. Illus. $5.

This modest and well-written book deals, in a remarkably brief space, with the main lines of scientific thought from antiquity to the 20th century. As the title implies, theory rather than practice is emphasized. Hull's point of view, that "nearly all the most significant ideas behind modern science have their origin in [Greek science]," leads him to give a much more extended treatment of Greek science (altogether fuller than that of comparable general histories) than he gives of the science of later periods. His treatment of the 19th, and especially of the 20th, century is decidedly brief.

Hull gives an unusually coherent account of the succession and filiation of ideas, at the expense of particulars on experimental science. One of his greatest concerns is "the contrast between empirical and a priori methods," and in comparing the Alexandrian and Athenian periods, he gives credit to both, declaring, "The triumph of empiricism was necessary for science. But speculation was an essential first step . . ." (page 124). His comparison of these two periods is especially interesting. He points out with unusual clarity their philosophic differences and attributes them to the influence of the sophists and the neglect of Plato at Alexandria.

Particulars get even shorter shrift in his treatment of the last two centuries; important experimental scientists (Black, Liebig, and Michaelson) and even whole sciences (acoustics) get lost. The 18th century is not lost, as it appears to be, for it is considered in the chapter entitled "Other developments in the 16th and 17th centuries"! But, notwithstanding the brevity, the main lines of recent scientific thought are well discussed, and perhaps better elucidated because of the omissions, for significant particulars are brought in cogently to illustrate the argument.

Hull has begun his work with a disclaimer of any intention of dealing with technology. The scientist will therefore be surprised to find himself referred to on the first and last pages (but apparently nowhere in between!) as a "technician." This slip, if such it be, may be connected with the author's concern "that men of science shall have more in common with other men of thought. Perhaps then they will have less to do with men of power" (page 325). Hull believes history to be useful to the accomplishment of this laudable aim, but not just any history. "Let everyone know the history of his own subject" (page 325). A scientist could do much worse than to begin with Hull's book.

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Fundamentals of Advanced Missiles. Richard B. Dow. Wiley, New York; Chapman and Hall, London, 1958. xvi + 567 pp. Illus. $11.75.

In the preface to this book Dow describes his objective as ". . . a comprehensive treatment of the subject that will present fundamentals in broad perspective but without emphasis on any one type of system." In view of the enormous breadth of the field covered and despite the obvious difficulty of avoiding any reference to information covered by military security restrictions, he has substantially achieved his objective by compressing a fairly comprehensive treatment into one volume of only 555 pages. If there is to be any criticism of this work, it must be on the matter of thoroughness rather than comprehensiveness.

Following a brief historical introduction, the book begins in earnest with a mathematical treatment of flight kinematics, based primarily on geometric considerations. The second chapter, entitled "Application of fluid mechanics to aerodynamics and propulsion," continues the development of kinematics into the area of fluid flow and thermodynamics. It continues with an easily understandable treatment of shock waves and then goes on to discuss rocket and ram-jet engines, ending with an extremely abbreviated section on propellants and combustion.

The author seems almost to have gone out of his way to avoid introducing Newton's laws of motion until the last possible point in the book. The laws appear at the beginning of chapter 3, under the general heading "Dynamics." The remainder of this chapter develops the aerodynamics of bodies, wings, and composite configurations and discusses such subjects as maneuverability, aerodynamic heating, range computations, dynamic stability, and automatic flight control systems.

Although a skilled statistician or operations analyst would undoubtedly consider the chapter on "Application of probability and statistics" to be rather elementary, I thought it to be one of the more valuable sections of the book. The subject is one about which many engineers working in the field of missiles and space vehicles seem to be poorly informed. Although still in the nature of an introduction, this part of the book covers many important elements of subject matter, using well-selected illustrations from fields of guided-missile engineering such as lethality, accuracy, reliability, and signal-to-noise ratio.

Succeeding chapters on microwaves, infrared radiation, and radar will be interesting primarily to those who have had little previous opportunity to study such phenomena and their applications to guided missiles. Chapter 8, on guidance, tends to be more descriptive than the previous chapters and therefore appears to suffer even more from the restrictions imposed by security considerations.

The final chapter considers complete guided-missile systems and outlines the engineering of such systems. This chapter should be valuable for the same reason that chapter 4 is valuable—namely, that not enough engineers and managers in the guided-missile business understand what is involved in true system-design work.

Perhaps the most accurate over-all summarization of *Fundamentals of Advanced Missiles* is that the book is neither to be regarded as a complete and thorough work on most of the subject matter it purports to cover, nor is it brief enough to be considered as a handbook. For reasons of security, no doubt, the illustrations are generally taken from obsolete equipment, such as the SCR-584 radar and the V-2 rocket. The student who is beginning for the first time to study seriously any of the disciplines involved would be better advised to use standard textbooks in physics, chemistry, and mathematics, rather than this composite work; however, as a text for a review or refresher course offered to graduate engineers and others already working in the field, this single-volume introduction should be very suitable.

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Traité de Paléontologie. L'origine des mammifères et les aspects fondamentaux de leur évolution. part 6, vol. 2, *Mammifères (évolution)*. Jean Piveteau, Ed. Masson, Paris, 1958. 962 pp. Illus. Cloth, F. 16,500; paper, F. 15,500.

The second volume of part 6 of the *Traité de Paléontologie* is the first of the two volumes on fossil mammals (other than primates) to appear. It includes consideration of the majority of the eutherian orders; essentially, only the Cetacea, Carnivora, and Artiodactyla among the eutherian orders and the non-eutherian mammals are reserved for the as yet unpublished first volume.

A number of paleontologists collaborated in getting out this extremely useful reference manual: Lavocat, Dechaseaux, Vaufrey, Viret, Saban, Hoffstetter, Guth, and Schaub, as well as Piveteau, contributed significant portions. The ordinal divisions follow essentially the classical arrangement, although the sequence of treatment (not truly significant), is at variance with the convention represented, for example, in Simpson's classification. Classification within the orders follows, of course, the interpretations of the collaborators; thus, for example, Lavocat's arrangement of the condylarths closely follows that of Simpson, and Viret's handling of the perissodactyls follows Simpson's with but minor differences. On the other hand, Schaub's treatment of the rodents and Saban's divisions of the Insectivora exhibit significant modifications.

The taxonomic entities, including genera and higher categories within the orders, are treated in an encyclopedic manner, so far as the more important diagnostic or distinguishing features are concerned, and the work is profusely