The Leopard's Spots: Scientific Attitudes toward Race in America, 1815–59. William Stanton. University of Chicago Press, Chicago, Ill., 1960. 245 pp. $4.

This study is centered around the "American School" of anthropology and ethnology which arose in the antebellum period. The most distinguished member of the group was Louis Agassiz, the Swiss-born naturalist, but the leading figures in developing the school were Samuel G. Morton of Philadelphia and Ephraim G. Squier, whose genuine contributions to the development of anthropology have been largely obscured by the fallacious conclusions drawn from their researches. The group supported a theory of polygenesis for the races of man and held that the divisions between the races were permanently established at their creation. Furthermore, in the "Scale of Nature," these races of man were ordered with the Caucasian at the top and the Negro at the bottom.

Stanton does a splendid job of placing the scientific problem in its social and intellectual context. He shows the character of the men involved in attempts to find a quantitative measurement of racial diversity, the inadequacy of the existing scientific knowledge, the social pressures working on scientific judgments, the interplay of research findings and attitudes toward race, and the ultimate failure of the school following the publication of Charles Darwin's *Origin of Species*. Although Stanton feels that the anti-Biblical crusade that accompanied the teachings of the school neutralized its support of racism among the slaveholders, one cannot help wondering how much of its "scientific proof" of the biological inferiority of the Negro filtered down into the popular mind of the post-Civil War period. Obviously, this book will interest anyone concerned with the background of the color line in the democratic ethos.

On the whole, the American school was a scientific failure, a blind alley, but in selecting it for study, Stanton has been better able to illustrate the complexity of scientific advances. In spite of fallacious conclusions, the work of the school on the nature of hybrids, the transmission of racial characteristics, the contradictions in the environmentalistic theories of biological change, and the inadequacies of the received Biblical account of the creation of races, helped focus attention on vital problems which had to be faced by the Darwinians. The school also helped in the subtle process of transforming the climate of opinion toward an active interest in the problem of racial origins.

Without wishing to quibble over minor points of interpretation, Stanton does attach considerable importance to the idea of *economy* in nature, meaning the frugality of nature, as a part of the outlook of the period (for example, pages 99, 109, 133), and he attributes the recognition of nature's "shocking waste" to Darwin (page 133). The word *economy* was commonplace in the language of natural religion and meant design. The design could include enormous wastefulness as well as frugality, and after the graphic pictures of fossil strata presented by Cuvier, the wasted productions of nature were widely acclaimed. Tennyson, for instance, in his *In Memoriam*: " 'So careful of the type?' but no. / From scarped cliff and quarried stone / She cries, 'A thousand types are gone; / I care for nothing, all shall go . . .'. "

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Teaching Comprehensive Medical Care. A psychological study of a change in medical education. Kenneth R. Hammond and Fred Kern, Jr. Published for the Commonwealth Fund by Harvard University Press, Cambridge, Mass., 1959. xxii + 642 pp. $10.

The decade of the 50's has been a period of experiment in medical education. A number of medical schools have modified their programs and are trying to evaluate the results. This book is a comprehensive report of one of these experiments.

In 1953, the University of Colorado School of Medicine established a General Medical Clinic designed to teach senior medical students "the techniques and philosophy of comprehensive medical care" (page 4). The staff of the clinic (in Denver, directed by Fred Kern, Jr., associate professor of medicine) collaborated with the behavior research laboratory at the university (in Boulder, directed by Kenneth Hammond, professor of psychology) in planning and executing a 5-year research project designed to evaluate the effects of the program. Although Hammond and Kern were the principal investigators and are now the senior authors, it is evident that their staffs contributed significantly to this very thorough and detailed work. The study and the report emerge as fine examples of interdisciplinary effort.

The subtitle, "A psychological study of a change in medical education," comes closer to describing the book than the title itself. About three-fourths of the volume (including the 60-page appendix) is concerned with details of the research. The reader is likely to learn more about the problems of *how* to study the effects of a change in curriculum than about *what* the effects actually are. Its careful and lucid account of research methods used in the study of parts of the educational process in medicine constitutes the book's major contribution. Particularly appealing are the authors' candid reflections on the difficulties met in the several stages of the research.

The authors are conscious of the dual audience for whom the book is intended: "the medical educator" and "psychologists and sociologists." There is enough material, however, to keep these and other groups (for example, educationists) busy for some time to come. Medical educators will read it; so will psychologists and sociologists interested in medical or professional education. But the book deserves a wider audience. Any scientist concerned with the measurement of change in human behavior in a specific (educational) environment will find this a very useful reference work.

One is inclined to agree with the authors that the research itself represents a "pioneer effort." It is unusual on two counts: (i) No other medical school has had a part of its program studied so exhaustively (although others have instituted more extensive changes in program). In no other institution, to my knowledge, has the plan to initiate a curriculum change been so closely intertwined with a research program carefully designed to study its effects. (ii) The design of the study followed classical lines, that is, each of three successive senior classes was divided into an experimental and a control group, the former attending the clinic, the latter the usual senior clerkships. The use of experimental and control groups within the same class over several years knows no parallel in experiments in medical education.

As might be expected, the strengths in the design also contributed weaknesses. Problems appeared in the course

of the research; for example, the project's "major crisis" arose when members of one control group demonstrated an unusual partisanship and hostility (page 123). Problems also arose in the analysis of the data: was it "really a control"? (page 154). The authors discuss these and other questions with freshness and freedom. Their observations should be extremely useful to those planning educational research in medical schools and in other settings.

The busy reader will find the "meat" of the work compressed in the 60 pages of Chapters 10, 11, and 12. The authors wisely present this unit (Part 2) early in the book, for it summarizes the main points of the research, findings, conclusions, and implications for the program. Some of the best writing in the book is found in these chapters. After reading the description of the educational program in Part 1, one gets a clear impression of the consequences of the research for the subsequent program. Parts 1 and 2 (about 160 pages) succeed in bringing to life the "Colorado story." In a foreword, Ward Darley (executive director, Association of American Medical Colleges) discusses the Colorado experiment in relation to the changing scene in American medical education.

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A California Flora. Philip A. Munz and David D. Keck. Published for the Rancho Santa Ana Botanic Garden by the University of California Press, Berkeley, 1959. 1681 pp. Illus. $11.50.

For a number of reasons, this is a very difficult book to review. First, one must emphasize that it is an important and extremely useful contribution to knowledge, and its importance is certainly more general than its title might imply to the uninitiated. Nevertheless, it has some curious failings that should be pointed out for the benefit of the uninitiated, into whose hands it will certainly come.

The only manual on the flora of California which has been available up to now is that of W. L. Jepson, published in 1925. Munz and Keck, then, fulfill a need for an up-to-date account of the flora, and their account has the additional advantages of an excellent introduction, the use of the metric system for measurements, and a useful list of authors who have been concerned with plants in the flora. (However, compared with Jepson's volume, the illustrations are so few as to be essentially insignificant.) For the botanist working in California, the only other sources available are the incomplete *Flora* of Jepson and the unfortunately expensive, four-volume *Illustrated Flora* of Abrams. The introductory sections on geological history (by D. I. Axelrod), on recent geological history and the vegetation, and on California plant communities are worth reading in their own right, whether or not one works in California; of course, the treatment of families and genera by specialists will always have scope and interest beyond a purely local one.

On these considerations, the book must be commended to botanists generally. On other counts, however, disappointment must be expressed. The value of the book for teaching is reduced by the paucity of illustrations, the thin paper, and the relatively high cost; probably, however, none of these could have been avoided. Unfortunately an arrangement of families has been used which differs greatly from the Englerian system customarily employed. Admittedly the arrangement, largely due to Keck, is an improvement over the Englerian one, but the fact remains that the latter system is still the one employed in the majority of manuals and herbaria. Furthermore, the reasons for the changes that have been made although they may be, to an extent, obvious to an angiosperm taxonomist, are not explained for the beginner.

In the *Flora*, wherever possible, published chromosome numbers are given for the species. This information may be useful for purposes of comparison or for use in selecting interesting problems for future research. However, the numbers given are not always correct, and there is no bibliography, although the references cited presumably may be found in the *Chromosome Atlas* of Darlington and Wylie. Unfortunately, the hypothetical x number (invented by Darlington) is sometimes given instead of the n number (actually determined) —for example, *Hunnemannia.*

Finally, I must mention the rather large number of typographical errors, particularly in the taxonomic section. These range from the transposition of several lines in the keys and descriptions and the inversion of type, to the consistent misspelling of the name of a genus (*Cynanchum*).

Despite these criticisms, more of method than of content, the book will be indispensable to taxonomists and to those concerned with the flora of the Pacific States.

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New Books

Handbook of Electrochemical Constants. Compiled by Roger Parsons. Academic Press, New York; Butterworths, London, 1959. 118 pp. $6.

The Helicopter. Jacob Shapiro. Macmillan, New York, 1960. 269 pp. $4.50.

Isotopic Tracers. A theoretical and practical manual for biological students and research workers. G. E. Francis, W. Mulligan, A. Wormall. Univ. of London Press, London; Essential Books, Fairlawn, N.J., ed. 2, 1959. 545 pp. $8.40.

Jaarboek. 1958–1959. Koninklijke Nederlandse Akademie van Wetenschappen. North-Holland, Amsterdam, 1959. 349 pp.

Materials and Techniques for Electron Tubes (revised edition of *Materials Technology for Electron Tubes*, 1951). Walter H. Kohl. Reinhold, New York; Chapman and Hall, London, 1960. 658 pp. $16.50.

Mathematics Refresher. Kurt Wolter. Philosophical Library, New York, 1959. 96 pp. $3.75.

Mechanisation of Thought Processes. vols. 1 and 2. National Physical Laboratory, Symp. No. 10. Her Majesty's Stationery Office, London, 1959 (order from British Information Service, 45 Rockefeller Plaza, New York). 990 pp. $9.29.

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Nuclear Power Plant. E. Openshaw Taylor. Philosophical Library, New York, 1959. 191 pp. $7.50.

Polysaccharides in Biology. Transactions of the fourth conference. George F. Springer, Ed. Josiah Macy, Jr. Foundation, New York, 1959. 326 pp. $5.95.

Principles of Paleobotany. William C. Darrah. Ronald, New York, ed. 2, 1960. 302 pp. $6.50.

Radioisotope Techniques. Ralph T. Overman and Herbert M. Clark. McGraw-Hill, New York, 1960. 492 pp. $10.

La Science et la Théorie de l'Information. Léon Brillouin. Masson, Paris, 1959. 402 pp. F. 4800.

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Subsurface Mapping. Margaret S. Bishop. Wiley, New York, 1960. 207 pp. $5.75.