work in carrying out these objectives. In general, the applications and the limitations of the various methods are clearly and concisely discussed. The recommended methods are very well presented, and possible sources of error and areas where caution must be observed are pointed out.

This volume is an improvement over the previous volume in that an attempt has been made to discuss methods for related topics in the same volume. For example, about a third of volume III is devoted to methods for polysaccharides, while another third is devoted to the determination of metal complexes and metallic ions.

The group of methods of general interest includes the determination of organic phosphorus compounds, assay of thioctic acid, the determination of histamine, and spectrophotometric methods for the determination of uric acid, hypoxanthine, adenine, and xanthopterine.

The group of subjects related to carbohydrate structure includes the use of periodate oxidations, end-groups analysis of polysaccharides, and the use of infrared analysis in the determination of carbohydrate structure.

The remaining third of the volume is devoted to the measurement of complex ion stability by the use of ion-exchange resins, analysis of metal-protein complexes, application of metal buffers and metal indicators, determination of zinc and flame photometry, and spectrometry.

This volume is an excellent addition to the series on biochemical methodology. It should be of considerable value to the research biochemist.

JAMES R. GILLETTE
*Laboratory of Chemical Pharmacology, National Heart Institute, National Institutes of Health*

**Studies of the Psychology and Behavior of Captive Animals in Zoos and Circuses.** H. Hediger. Translated by Geoffrey Sircom. Butterworths, London, 1955. vii + 166 pp. Plates. 30s.

H. Hediger, director of the Zoological Gardens at Zurich and professor of animal psychology at the University of Zurich, says: "To me, the animal psychologist seems like a cave explorer, who, making his way through impressive tunnels, finds himself groping at the threshold of some lofty cavern, access to which will some day be granted to his astonished gaze." Hediger has traveled in Europe, the United States, Africa, and the South Pacific islands, always observing the behavior of animals both in captivity and in their native wilds. He has followed his former book, *Wild Animals in Captivity,* with this one, which treats of the psychology of animals.

This is a comprehensive book and attacks many problems. The animals' flight reaction, for instance, is the distance at which an animal becomes alarmed by man or by an enemy, and at which it runs away. Hediger has actually measured the number of feet at which an African buffalo in the wilds will take alarm, and compared it with the distance that alarms a buffalo on a reserve where he has learned that he is safe. The "need to escape" is a greater drive with animals than sex or hunger.

A study of animal tracks, both in the zoo and in the wild, shows that animals, like man, tend to follow certain paths. Of freedom, he says, "It has two aspects; one for the predator that is lucky enough to find a particularly tasty victim; and another for the victim that is lucky enough to escape from a particularly dangerous enemy."

He has not confined his studies to the big, showy zoo animals, but has an interesting chapter on the so-called "hypnosis" exercised by snakes, and a study of "fascinatory organs" used by some snakes to decoy their prey.

The social relationships among animals are discussed all through the book —even the social significance of antlers in deer. When different species live together, one is always dominant. There are fascinating accounts of fighting ceremonials and of mating ceremonials, though Hediger says that too little is known about preliminary courtship rituals except in the case of some birds.

The relations of male animals to the young, of females to their young, and of the young to each other are studied. Begging among zoo animals is said to be not only a request for food but for companionship.

The psychology of circus animals differs from that of zoo animals because of their much closer contact with trainers, grooms, and in some cases with the public.

Descriptions of animals at play include accounts of his visits to the famous trained animals at the St. Louis Zoo and the porpoises at Marineland.

The book is full of interesting information—for example, that the giant sloth of Patagonia was probably kept as a sort of domestic animal by the aborigines; that the Watussi cattle are kept ceremonially, and are not butchered, milked, or bled (their only use is to furnish dung for fuel and urine for bathing purposes); and that, if a dog bites a man, it may be because he regards the man as a social rival.

There are informative notes on the birth of a giraffe and the birth of a kangaroo, and on the sleeping habits of elephants.

The book is divided into 11 chapters, such as "The animal's expression," "Animal psychology in the circus," "Wild and domestic animals," "Mother and child," and "Animals among themselves." The photographic illustrations are unusually good.

This is a book that provides worthwhile reading which nature lovers may read with interest and enjoyment and then put in a nearby file as an excellent reference book. A bibliography of 197 titles is included.

W. M. MANN
*National Zoological Park*

**Précis de Géologie.** Leon Moret. Masson, Paris, ed. 2, 1955. ix + 669 pp.

It is very helpful for the American teacher of geology to learn how his subject is presented in other parts of the world. This book by Leon Moret of the Ecole Nationale Supérieure d'Hydraulique at Grenoble, gives an excellent survey of the science of geology as it is taught in French institutions of learning.

One need have no worry concerning the geologic background of our French colleagues, if we can assume that they are familiar with all the information in Moret's book. The book covers both physical and historical geology, and although the organization may differ from most American textbooks, the over-all coverage is about equal to that presented to our geology majors in a first-year course.

The first part of the book, after an introduction in which some general principles of geology are discussed, is mostly concerned with the various rocks and minerals that make up the surface of the earth. The discussion on the classification of minerals and crystals is especially well written.

This book goes on to discuss fossils and the various principles of stratigraphy. There is an abbreviated summary of classification as well as a brief résumé of the main faunal and floral elements of the different major periods.

The third part concerns tectonics, and while this part may be a little more thorough than that given in most comparable American textbooks, the section should be of considerable interest to the somewhat more advanced student.

The fourth part consists of an excellent survey of historical geology, with special emphasis on events in France and elsewhere in Europe. This section leans heavily on the work of Gignoux, to whom suitable credit is given. This section should be very useful to American students who wish to learn more details, especially concerning events in Europe, than are given in the average American

textbook. The listing and explanation of standard European time units, such as Turonian, Danian, and so forth, are very helpful.

There are certain differences in terminology from those generally used in the United States. For example, following earlier custom, the Silurian is regarded as the Lower Ordovician, and the terms *Primary* and *Secondary,* obsolete in America, are used for the Paleozoic and Mesozoic, respectively.

There are 322 drawings and maps that supplement the text, and also a bibliography, mostly of French works, that covers all sections of the book except historical geology, for which the reader is referred to the work of Gignoux.

I found the book most interesting and well organized. It might well be assigned as collateral reading to seniors and candidates for higher degrees. Not only would it improve their knowledge of French, but it would also prove helpful in giving somewhat different viewpoints of certain problems and in filling in gaps, especially in reference to events that took place in the geologic history of Europe.

HORACE G. RICHARDS
*Department of Earth Sciences, University of Pennsylvania* and *Academy of Natural Sciences*

**The Negro Potential.** Eli Ginzberg. Columbia University Press, New York, 1956. 144 pp. $3.

Concern for human resources should grow increasingly in view of the serious shortage of personnel in scientific and technical fields—and in all fields, so my colleagues insist. Some of the factors that affect the participation of a social group in the activities of society are ably discussed by the director of the conservation of human resources project at Columbia University, Eli Ginzberg, professor of economics, and his associates. This slim volume, which is the second major publication of the project [the first was *The Uneducated* (1953)], reports the results of a study of the Negro in the United States, supported by a judicious selection from the documentary material bearing upon the problems of the Negro.

In the six chapters the authors focus their attention in turn upon: (i) "The challenge of Negro potential"; (ii) "Expanding economic opportunities"; (iii) "The educational preparation of the Negro"; (iv) "The Negro soldier"; (v) "Better preparation for work"; and (vi) "Lessons for manpower policy." The second longest chapter, the fourth, is probably the most significant, for it deals with the Negro soldier, and it is in the armed forces that the most thorough integration of the Negro has been achieved. The authors handle their material here, as throughout the book, in a candid, objective manner, balancing fact against fact without any tendency toward an extreme position. Part of their conclusion is: "But integration in services has demonstrated the remarkable ability of both whites and Negroes to adjust to new relations with each other in such a manner that the potential of each can be more fully realized." The book quotes a 1955 report from the U.S. Department of Defense which states: "Thorough evaluation of the battle-tested results to date indicates a marked increase in overall combat effectiveness through integration. Economies in manpower, material, and money have resulted from the elimination of racially duplicated facilities and operations."

In my opinion, the material in the final chapter, "Lessons for manpower policy," deserves especially wide dissemination. If two statements made and carefully supported by the authors find wide acceptance, the book will make a salutary contribution to the perspective that is essential for intelligent planning to meet these national problems. The first of these is a quotation and appears earlier in the text: "Most social scientists now believe that there are no inborn differences in intellectual potential between Negroes and the rest of the population, or that such differences, if they exist, are very small." The second is the opening paragraph of the final chapter: "It is never sensible or right for a nation to waste valuable human resources through failure to develop or utilize them. The consequences of such waste are a lower level of national strength and individual well-being."

This is a significant study which should be read especially by all persons concerned with programs for relieving the shortage of personnel in science and engineering. Clearly there is no a priori reason that every distinguishable social group should contribute to each scientific or other field to an extent that is commensurate with its population ratio. However, the 1956 figures on medical-school graduates would suggest that something should be done with respect to the Negro. Of the 6997 persons who graduated in June 1956 from 87 medical schools, 173 were Negroes, with 132 graduating from Howard and Meharry. Yet there are 16 million Negroes in this country, roughly one-tenth of the population, and a number equal to the population of Canada. A careful study of this book is an indispensable prerequisite for intelligent action in righting such imbalances.

HERMAN BRANSON
*Department of Physics, Howard University*

## Books Reviewed in The Scientific Monthly, October

*Virginia at Mid-Century,* J. Gottmann (Holt). Reviewed by M. C. Prunty, Jr.

*Carl Friedrich Gauss: Titan of Science,* G. W. Dunnington (Exposition Press). Reviewed by E. A. Cameron.

*Free Skin Grafting in Patients with Extensive Defects,* B. A. Petrov (State Publishing House of Medical Literature, Moscow). Reviewed by S. A. Corson.

*Microbiology,* F. C. Kelly and K. E. Hite (Appleton-Century-Crofts). Reviewed by H. M. Rose.

*The Principles of Mechanics,* H. Hertz, translated by D. E. Jones and J. T. Walley (Dover). Reviewed by J. Turner.

*Birthplace of the Winds,* T. Bank II (Crowell). Reviewed by F. de Laguna.

*Guided Missiles in War and Peace,* N. A. Parson, Jr. (Harvard University Press). Reviewed by S. F. Singer.

*The Piltdown Forgery,* J. S. Weiner (Oxford University Press). Reviewed by W. L. Straus, Jr.

*Indians of the Northwest Coast,* P. Drucker (McGraw-Hill); *The Coast Salish of British Columbia,* H. G. Barnett (University of Oregon Press). Reviewed by R. F. Spencer.

*The Antarctic Challenged,* E. R. G. R. Evans (De Graff). Reviewed by L. M. Gould.

*Oeuvres de Lavoisier. Correspondance,* R. Fric, Ed. (Albin Michel). Reviewed by E. Rosen.

## New Books

*Ceramics for the Archaeologist.* Publ. 609. Anna O. Shepard. Carnegie Institution of Washington, Washington, D.C., 1956. 414 pp. Cloth, $7.75; paper, $6.75.

*Handbuch der Physik.* vol. 1, *Mathematical Methods.* 364 pp. DM. 72. vol. XLVII, *Geophysics.* 659 pp. DM. 118. S. Flugge, Ed. Springer, Berlin, 1956.

*Behavior Theory and Conditioning.* Kenneth W. Spence. Yale University Press, New Haven; Geoffrey Cumberlege, Oxford University Press, London, 1956. 262 pp. $4.50.

*Technique of Organic Chemistry.* vol. II, *Catalytic, Photochemical, and Electrolytic Reactions.* Arnold Weissberger, Ed. Interscience, New York, ed. 2, 1956. 543 pp. $11.50.

*An Introduction to Modern Organic Analysis.* Sidney Siggia and Hans J. Stolten. Interscience, New York, 1956. 250 pp. $4.50.

*Experimental Physical Chemistry.* Farrington Daniels, Joseph H. Mathews, John W. Williams, Paul Bender, Robert Alberty. McGraw-Hill, New York, ed. 5, 1956. 482 pp. $6.50.

*Science in Progress.* Ninth Series. George A. Baitsell, Ed. Yale University Press, New Haven, Conn.; Geoffrey Cumberlege, Oxford University Press, London, 1956. 343 pp. $6.50.

*Grinnell Workbook in Biology.* Biology Staff, Grinnell College. Norman H. Russell, Jr., Ed. Burgess, Minneapolis, 1956. 56 pp. $1.75.