by Japanese and others. This book summarizes much of the natural history and geographic information resulting from the many expeditions to Micronesia and the work of resident investigators there since the U.S. took over the islands at the end of the war. In addition, the author reads Japanese, which enables him to draw upon the extensive Japanese literature.

Sections on geology, soils, climate, flora, geography, fauna, ecology, economic entomology, as well as a list of principal collectors of insects and a gazetteer of place names, present in a brief space much of what is known for Micronesia in most of these fields. Some unpublished data were not available to the author, and some data he obtained from others were not as accurate nor as reliably interpreted as are his personal observations and researches. There are also many evidences of haste in certain parts, resulting from the necessity of making the work quickly available to the other collaborators in the series. Although this work would have unquestionably been better if written five years hence, after the accumulated collections have been identified and more information published, in its present form it is so much better than anything else, as a compendium of the geography and natural history of Micronesia, that criticism is scarcely in order. The volume can be freely commended to anyone interested in Micronesia or in the Pacific in general.

F. R. FOSBERG

Falls Church, Virginia

Die Evolution der Organismen. Ergebnisse und Probleme der Abstammungslehre. Gerhard Heberer, Ed. Gustav Fischer, Stuttgart, ed. 2, 1954. Part I, *Grundlagen und Methoden,* 176 pp. Illus. DM 14.30, subscription, DM 12.10. Part II, *Die Geschichte der Organismen,* 248 pp. Illus. DM 21; subscription, DM 17.70. Part III, *Die Kausalität der Phylogenie,* 288 pp. Illus. DM 23.90; subscription, DM 20.20.

The number of completely revised editions of works in the field of evolution that were first published only 10 years ago indicates the rapidity of the recent advance in evolutionary biology. This would seem to belie the opinion of some outsiders that evolutionary research had matured to the point of stagnation. The revised edition of Heberer's *Die Evolution der Organismen* is, in many respects, a new work. Five of the 19 contributors to the first edition of 1943 have dropped out and have been replaced by six new contributors. The new edition is published in installments, three of which have now appeared, all in 1954. Nearly all the chapters have been completely rewritten, and are organized into four major sections: (i) Principles and methods; (ii) the history of organisms; (iii) the causes of evolutionary change; and (iv) phylogeny of the hominids.

The following new or completely rewritten chapters are specially noteworthy: Rensch on phylogenetic changes of ontogeny, Lorenz on psychology and phylogeny, Remane on the phylogeny of animals, and Friedrich-Freksa on the evolutionary role of viruses and the problem of the origin of life. The other contributors are Dingler, Eickstedt, Gieseler, Heberer, Herre, Krogh, W. Lehmann, Lüers, Ludwig, Mägdefrau, Reche, Rüger, Schwanitz, Ulrich, Weigelt, and W. Zimmermann. Remane's contribution is a brilliant survey of the phylogeny of animals which, particularly with respect to the invertebrates, presents many original concepts and observations. The emphasis in much of the volume is on phylogeny, as is characteristic for the evolutionary literature on the continent, yet two large chapters on genetics and evolutionary research in plants (127 pp.) and animals (110 pp.) present a full summary of modern research in systematics, cytogenetics, and population genetics. The work is well printed and lavishly illustrated (250 figs. in the first three installments).

The volume will be particularly useful to those who are unable to keep up with the flood of original papers in the field of evolution. There is no other single volume in any language that treats the subject even nearly as comprehensively.

ERNST MAYR

Museum of Comparative Zoology, Harvard University

Earth Sciences

Nuclear Geology. A symposium on nuclear phenomena in the earth sciences. Henry Faul, Ed. Wiley, New York; Chapman & Hall, London, 1954. xvii + 414 pp. Illus. $7.

Nuclear physics has always had strict relations with geologic problems and the interaction between the two sciences has been a most fruitful one. Suffice it to quote the extremely important part played by mineralogical and geologic considerations in the discovery of radioactivity, and the establishments of an absolute time scale for geology.

In the last years the progress of nuclear science has been conspicuous and also the special branch of the geologic application has made great strides. No systematic review had been published for many years and these circumstances make the present book very timely. As usual, the fact that probably no author exists who has the necessary encyclopedic knowledge, *and* the time to write a book such as this, has made the cooperative form of authorship necessary.

The parts of the book are: (i) Fundamental considerations, instruments, and techniques of detection and measurement; (ii) uranium and thorium; (iii) the abundance of potassium; (iv) rare gases and fission in nature; (v) heat from radioactivity; (vi) radiation damage and energy storage; (vii) hydrocarbons formed by the effects of radioactivity and their role in the origin of petroleum; (viii) geophysical exploration by nuclear methods; (ix) determination of absolute age; and (x) the origin of the earth.

The authors, 26 in number, represent an extremely well qualified and authoritative group; but in spite of this, occasional errors have escaped their attention.

Good indexes help very much in consulting this

book which is really full of information in a wide field of subjects (to which the titles of the chapters do not do complete justice).

It is also clear that the field is in a phase of rapid development and that for each problem solved, a new and interesting one arises. This is one of the reasons why the reading of this book is so stimulating.

In addition to all this, the book makes good reading and will interest not only the specialists but also many scientists in the broad sense of the word. I passed several pleasant and instructive hours in its company and can recommend it, not only to the specialists who presumably must have it but also to scientifically minded persons at large.

EMILIO SEGRÈ

Department of Physics,
University of California, Berkeley

Some Fundamentals of Petroleum Geology. G. D. Hobson. Oxford Univ. Press, London–New York, 1954. x + 139 pp. Illus. $2.90.

As inferred by the title, this small volume presents a detailed discussion of a few selected topics and is not an over-all treatise of the subject of petroleum geology. The contents, which are divided into five chapters and three appendixes, are almost wholly concerned with the subjects of reservoir fluids, origin, migration and accumulation of oil, and reservoir pressures. The general presentation of the material is excellent and the author's deductive reasoning is stimulating in that he attempts to apply quantitative data to these selected topics. The chapter entitled "Migration and accumulation" was found to be especially well prepared, with a good discussion of such topics as inclined oil-water contacts, and with several original drawings.

In several instances Hobson refers to formation names or proper names in which no geographic location is given. Examples and references are in some cases omitted from discussions of considerable importance. A short appendix of definitions includes relatively well-known terms, such as permeability and porosity, but excludes less known terms such as Athy's compaction law. It is hoped that future editions will eliminate these few criticisms.

The book is recommended to general readers of reasonable scientific background as well as to students of petroleum geology of considerable advancement.

PAUL W. HUGHES

Department of Geology, University of Illinois

Applied Geophysics in the Search for Minerals. A. S. Eve and D. A. Keys. Cambridge Univ. Press, New York 22, ed. 4, 1954. x + 382 pp. Illus. $7.50.

The original edition of this well-known book appeared in 1929. With the smaller book by E. Pautsch, it represented one of the first few books written in North America relative to geophysical prospecting methods. As a text used at McGill University for more than 20 years, it is natural that it chiefly emphasizes geophysics in the search for ores. It presents the subject in terms of the specific geophysical methods, with emphasis on the instrumentation that has been used or is being used. There are 160 figures showing instruments, circuit diagrams, and results of field tests or surveys. A new chapter on radioactive methods has been added; also newly included is material concerning gravimeters and gravimeter surveys; seismic reflection methods; air-borne magnetic methods, and a brief description of Lundberg's air-borne inductive equipment. References to about 250 articles and books are included. The most conspicuous omission in this list of references, in my opinion, is the failure to cite the GSA special paper No. 36, "The handbook of physical constants of rocks and minerals," 1942, edited by Francis J. Birch. This book contains a wealth of data basic to geophysical prospecting methods.

The book is written with a contagious degree of enthusiasm for the subject and will be especially appreciated by the nonmathematical reader who desires a clear introduction to an inherently complicated subject.

LOUIS B. SLICHTER

Institute of Geophysics,
University of California, Los Angeles

Seismicity of the Earth and Associated Phenomena. B. Gutenberg and C. F. Richter. Princeton Univ. Press, Princeton, N.J., ed. 2, 1954. ix + 310 pp. Illus. $10.

The first edition was exhausted within five years. This proves that this book is of high quality and responds to a need. The second edition follows the same outline but has been brought up to date by addenda augmenting the bulk by 14 percent. Divided into three parts, the first part gives information on the material upon which the book is based and on the methods used in collecting and treating this material. A general outline on the seismicity of the earth is given, including discussions on the classification, frequency, and energy of earthquakes, as well as on our knowledge of the structure of the earth based on observation of earthquakes and interpretation of seismic records. Two world maps give the general geographic distribution of earthquake foci, showing the main belts on which the seismicity of the earth is chiefly concentrated.

The second part consists of a regional description and discussion of seismicity of the earth by text and maps, for which purpose the earth's surface has been subdivided into 51 regions. As pointed out, the work is intended "to discuss the geography and the geologic character of the zones and areas of seismic activity." This includes correlation with alignments of active volcanoes and gravity anomalies, and with oceanic deeps, mountain structures, and other topographic features.

Special sections are devoted to tsunamis (seismic

sea waves) and to a discussion of the causes of earthquakes and of the mechanism of focal motion. The second part ends with a list of references of 19 pages. The third part is a collection of chronologic and regional tables in which the damaging earthquakes since 1904 are listed. The earthquakes are classified by focal depth (shallow, intermediate, and deep shocks) and "magnitude." Information is given on time of occurrence, geographic coordinates of focus, focal depth, and the accuracy of this data. The "magnitude" of an earthquake is a very useful notion introduced in 1935 by C. F. Richter. It is a figure obtained from seismographic records, which is a measure of the energy released in an earthquake. A list of active volcanoes containing name, geographic coordinates, date, and character of the last eruption is included. The book is the standard work on seismicity of the earth. It will be a guide for anyone who wants information on this subject.

FRITZ GASSMANN

Institute for Geophysics,
Swiss Federal Institute of Technology

Climatic Atlas of the United States. Stephen Sargent Visher. Harvard Univ. Press, Cambridge, 1954. xii + 403 pp. Illus. $9.

The concept of climate is deceptively simple. Defined as average weather, or the long-term state of the atmosphere, depiction of climate might seem to be a simple matter of filling out a map with a few well-chosen symbols. Unfortunately (or perhaps fortunately, at least for the intellectually curious), climate contains so many facets that no stereotype has been agreed upon. In Visher's *Climatic Atlas of the United States* more than a thousand maps and diagrams are employed. As the exposition of climate by means of manifold maps is perhaps Visher's chief contribution to climatology, it is interesting to see how effective the technique is in the present volume.

The maps and diagrams are mostly simple, crisp line drawings. At a scale of about 1 : 40,000,000, three maps are placed on a page only slightly oversize (7 by 11½ in.) Legends appear in the margins and, with the exception of a short introductory text and a few pages of explanation elsewhere, the maps stand alone. Temperature and precipitation command the major part of the atlas (688 maps) but the remainder covers a wide range of subjects (not flying weather, however), including such disparate topics as ratings of regional climates as they, presumably, affect human energy, the annual death rate attributable to lightning, and the maximum depth that frost penetrates the ground (compiled originally by the U.S. Weather Bureau from reports of gravediggers). Usual runs of annual and monthly means are present in abundance, but weekly and seasonal periods are treated as well, and many terms other than the arithmetic means are shown.

In this large collection, most persons cannot fail to find some maps of real interest. The search for specific maps is aided by an index and by a reasonable arrangement of the subject matter. A cover-to-cover perusal of the atlas is a rather dull chore, however, leaving impressions of duplication (one subject, the frequency of heavy rains, appears in three closely similar maps) and of discrepancies in style and content.

Undoubtedly the greatest limitation was imposed by the choice of map scale. As examples of the generality of the maps, one notes that a climatic hint is lacking as to the presence of national forests in Nevada; even the outstanding economic importance of winter snow packs on western mountain ranges is poorly shown on maps of snowfall and snow cover. Diversity of subject rather than perfection of detail is the strong point of this work and, judged by the reception of climatic maps in the past, it is safe to predict that the *Climatic Atlas of the United States* will find a large use for many years.

HARRY P. BAILEY

Department of Geography,
University of California, Los Angeles

Medical Sciences

Handbook of Radiology. Russell H. Morgan and Kenneth E. Corrigan, Eds. Year Book Publ., Chicago, 1955. x + 518 pp. Illus. $10.

This *Handbook* is largely a compilation of a large amount of quantitative data related to the use of ionizing radiations in medical, scientific, and industrial applications. It should be of great value to workers in these fields, at levels of both basic research and practical application. The specific data here included in one volume are available elsewhere only from a variety of sources.

The material is divided into six major sections and four appendixes as follows: Definitions of physical terms and units, including conversion formulas and tables; general physical information (including biophysical data); radiotherapeutic data; radioisotopes; radiography and fluoroscopy; radiation protection; common drugs used in radiology; mathematical tables; the Greek alphabet, and schematic diagrams of x-ray generators and particle accelerators. There is an excellent and comprehensive index. Noteworthy for their inclusion are sections on medical radiographic technique, complete data on radioactive isotope physical characteristics and decay systems, and summaries of radiation protection material from the many handbooks published by the National Bureau of Standards for the National Committee on Radiation Protection.

The typography is legible and the proofs were evidently carefully corrected. Certain workers in medical radiations might have wished for additional radiobiological data, but the authors may have been unwilling to include material, the accuracy of which might not yet be firmly established.

This *Handbook* is authoritative, remarkably complete, handy in format, and well organized. It should