training, character selection; medical care of flying personnel, aeromedical instruction; effects of pharmaceutics on efficiency, anoxia and efficiency; rations and in-flight feeding, stimulants; toxicology of fuels.

Part XII, entitled "Emergency Procedures" (O. Schröder, M. Matthes, K. Schäfer), has three chapters on air evacuation of wounded, organization, equipment, and procedures; air-sea rescue, organization and operation, special hazards; thirst and its control.

Part XIII (K. Büttner, H. Desaga) deals with the effect of air warfare on civilians, with chapters devoted to the physics and the effects of conflagrations, the production of dust by explosions, protective measures and medical problems of dust asphyxsia, and chemically active and inert dusts.

The final section, Part XIV, on the effects of blasts (H. Schardin, T. Benzinger, R. Rössle, H. Desaga), discusses the physical principles underlying the effects of explosions, the physiological effects of blasts in air and in water, the pathological findings in autopsies, clinical experience, and therapeutic measures.

In spite of its large size and broad scope, this work is not (nor does it pretend to be) an exhaustive or even a well-balanced presentation of the whole field of aeromedicine. General editorial supervision was evidently deemed impracticable, and as a result there are some duplications and minor instances of discrepancies. The various parts and individual chapters differ widely in general approach, some authors presenting a monograph in their chosen subject, with upward of a hundred or more references, others giving detailed reports of a few special research projects, or a brief general discussion with very meager factual data and few or no references, these variations in general character being due in part to the nature of the chosen subject. Certain topics, for example, the medical problems related to headward accelerative forces, and the anti-g suit, are not considered at all, and the whole broad field of aviation psychology, and several special subjects (explosive decompression, ejection seats) are poorly represented. Also, very little German work later than 1944 is included, and the references to work outside of Germany are mostly prior to 1940. Naturally some of the reported research has been done better elsewhere or has been superseded by more recent work.

Nevertheless, this book should prove exceedingly valuable to research workers in aeromedicine and to all those who wish to be well informed in the subject; for an organized collection of this magnitude, with all major divisions represented, will no doubt remain unique, it being highly improbable that a similar collection of wartime aeromedical research in the Allied countries will ever be attempted. Although the major divisions of the field were naturally the same in all countries, there were great differences in emphasis. And certain subjects—for example, altitude acclimatization of flying personnel—which were considered important in Germany throughout the war, received relatively little attention elsewhere. The book also contains descriptions of dozens of novel and ingenious techniques and instruments. And the numerous projects that were left incomplete for various reasons offer stimulating suggestions.

Most of the chapters were written in German and translated, with few exceptions, into good idiomatic English. The numerous illustrations, graphs, diagrams, photographs of apparatus and of original recorded data, add greatly to the value of the text. The detailed table of contents compensates somewhat for a rather condensed index.

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Les Hautes Temperatures et Leurs Utilisations en Chimie, 2 vols. P. Lebeau and F. Trombe, Eds. Paris, France: Masson et Cie, 1950. 1,397 pp. 9,000 fr.

This work, compiled by P. Lebeau and F. Trombe with the collaboration of 34 authors, has as its goal the collection of information concerning the production and utilization of high temperatures for chemical purposes. The first 17 chapters are devoted to the discussion of methods used for the production of high temperatures. Included are chapters on flames, solar radiation, electrical resistance furnaces, high-frequency induction furnaces, arc furnaces, vacuum furnaces, etc. The general plan followed in the discussion of each type of furnace is to present the theoretical aspects of the subject, then describe various experimental arrangements that have been used, and finally to mention some of the applications of the particular method described in the chapter. The extent of the theoretical discussion varies considerably in the various chapters, but in general the treatment is adequate. The sections on experimental details include information concerning the properties of the materials used and the behavior of the substances over a wide range of temperatures. For example, the first chapter, which deals with flames, has a detailed discussion of ignition temperatures as a function of composition, limits of inflammability, flame velocities, properties of combustible gases (in tables), dissociation of gases at high temperatures, tables of the enthalpies of common gases from 288° to 5,000° K and flame temperatures. The fifth chapter, which discusses electrical resistance furnaces, presents data on the corrosion of alloys, the flow of alloys under pressure at high temperatures, resistance, and other properties.

The eighteenth chapter describes methods for the measurement of high temperatures, the nineteenth presents methods for the regulation of such temperatures, and the twentieth discusses methods for the study of reactions at high temperatures. The next chapter deals with ceramic studies. Then we find 8 chapters dealing with the properties of substances of interest in high-temperature work. These chapters contain many phase diagrams for two- and three-component oxide systems. The principal oxides discussed are those of silicon, aluminum, chromium, titanium, tin, magnesium, beryllium, calcium, zirconium, and thorium. A discussion of industrial refractory materials, a brief chapter on powder metallurgy, a chapter on very refractory metals, alloys, and metallic compounds follow. The book ends with a set of extensive tables of constants, four appendices dealing with the hydrogen fluorine flame, some supplementary material on the regulation of furnaces, thermal insulators, and a discussion of the temperature scales used in the work reported in the body of the text. Finally we have a 50-page index.

Certainly anyone working with high temperatures will find much of interest to him in these two volumes. On the other hand, he will also find much that he will wish had been eliminated. It is interesting to have descriptions of various furnaces collected in one place, but some of those described here would probably be of more interest to a scientific museum than to a modern research worker. The reviewer believes that the subject matter could have been condensed at least 30 per cent without detracting from the usefulness of the book. Such a reduction should not be applied to all chapters indiscriminately. Thus Chapter 3, on solar radiation, could be eliminated completely without any great loss, whereas many might like to see the chapter on powder metallurgy amplified. Also, it is doubtful that Chapter 12, which discusses the chemical phenomena caused by an electric discharge in a gas, belongs in a book of this type. In spite of these faults the reviewer believes that the book is of such usefulness that it will be a desirable addition to the libraries of those interested in high-temperature work of any kind.

Mechanically the book is excellent. It is well printed on good paper and substantially bound.

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The Chordates. Herbert W. Rand. Philadelphia: Blakiston, 1950. 862 pp. $6.00.

To the field of comparative vertebrate morphology Professor Rand has contributed yet another textbook—a revised and fact-full version of his *Comparative Anatomy,* co-authored with Professor Neal. The present work emphasizes general structure and vertebrate types. In writing this treatise, Rand had in mind "to undertake a book which, to its content of anatomic fact, should add chapters (necessarily brief) giving the reader some knowledge of the history of anatomic science, the ideas and motives which have directed its progress through successive centuries, the theories and principles whereby it has worked, and, above all, an appreciation of its vital human import."

The Chordates, like Gaul, is divided into three parts, and almost as arbitrarily. Part I describes the "basic structure" of vertebrates, after which follow sections on organogenesis and histology. This portion minimizes the comparative viewpoint; it includes, however, much of the content and many of the illustrations of the earlier work by the same author. Part II considers briefly the history, aim, and methods of comparative anatomy. Part III, "Comparative Morphology of the Chordates," is a phylogenetic survey of chordate anatomy and relationships; it presents, by classes, discussions of animal structure, ancestry, phylogeny, and classification, the last relatively simplified. The feeling for comparative anatomy is developed slowly, and the reader has covered all the organ systems and half the book before an insight into comparative principles takes hold. The epilogue states a refreshing case for comparative morphology which, in essence, would have been welcome if proclaimed as an introductory point of view, perhaps in the prologue.

Only high praise can be offered for Rand's command of morphological detail and his erudite presentation of structural relationships. The attractive format, including bold-face type for new terms and many excellent illustrations (a total of 609, approximately half of which were previously published in *Comparative Anatomy*), emphasizes for the student the countless number of facts with which the anatomist must deal.

It would be presumptuous to find fault with a work of this magnitude. Only an occasional lack of emphasis in the presentation seems to mar the decisiveness with which the chordate patterns have manifested themselves. "What is a vertebrate?" is inquired of the reader immediately upon opening the book, and in part this question is answered promptly with discussions of such characteristics as symmetry, body divisions, locomotor appendages, integument, notochord, coelom, and tube-within-a-tube structure. Yet it is not until the succeeding chapter that the branchial clefts are thought worthy of mention, and five chapters later that the dorsal tubular nervous system becomes significant. The evidence pertaining to the origin of the vertebrates is weakly treated, neither the possibility of prechordate affinities with echinoderms or the relationship of vertebrate ancestors to fresh-water jawed placoderms being sufficiently weighed. Finally, some unusual definitions have crept into the context without adequate explanation or derivation: e.g., "molar" and "molecular" activity to designate somatic and visceral nervous functions, respectively.

The Chordates is more than a book on anatomy. It is a morphological treatise supplemented with histological, embryological, paleontological, and historical concepts gleaned from Professor Rand's personal storehouse of information and wide experience as a scholarly teacher. As a standard of reference and a survey of the field it is a worthy contribution and deserves a successful future.

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Variation and Evolution in Plants. G. Ledyard Stebbins, Jr. New York: Columbia Univ. Press, 1950. 643 pp. $8.00.

Professor Stebbins' latest work is indeed a magnum opus—an exhaustive and critical review of data that bear on the evolution of plants. The facts and examples are lucidly presented, and the arguments of which they are the bulwark are cogently and logically developed. The book is clearly the product of acute observation, matured reflection, and a governed imagination. It is an appropriate companion to its distinguished predecessors issuing from the Jesup lectures.

The announced intention is "to discuss the principles and dynamics of evolution" (p. 7). The approach is frankly taxonomic. "The fund of information built up by systematic botanists and zoologists during the past 300 years is the first source of [the evolutionist's] factual data" (p. 4). Stress is placed on comparison of different patterns of evolution in various categories, particularly at the specific level, and an explanation is given in genetic, distributional, and historical terms.