

them and do not participate in them. Pavlov made great contributions to neuropsychology, some of which have some applicability to the understanding of prison experiences, as they do to the understanding of many other types of experience; but Pavlov's hypotheses about the temperamental characteristics of dogs, and the relation of these to certain types of conditioning procedures, provide only the dimmest sort of illumination for the complex social and political phenomena of modern times.

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**Glossary of Geology and Related Sciences.** J. V. Howell, coordinating chairman. American Geological Institute, Washington, D.C., 1957. x + 325 pp. \$6.

The idea for this *Glossary* was formed in early 1950, work was started on it 1 Mar. 1953, and it was published in June 1957. With a staff of about 90 specialists, it covers some 25 geologic fields, going from "a, direction . . ." to "zygote, a fertilized egg. . . ." J. V. Howell and his group have accumulated a great number of terms, and although I have not read them all, those I have checked are well handled and correct. Lynn M. Nichols, of the *Oil and Gas Journal*, is technical editor and has edited all of them, to the betterment of the book.

There has long been a need for this *Glossary*. There are perhaps five dozen dictionaries and glossaries in which various geologic terms are defined, but this is the first one that covers the field and related sciences. (This covers some 14,000 terms.) Everyone connected with the project should feel proud of a good job well done. It is expected that this edition will be exhausted before long, and additional terms will be included in the next. We all need the book and should use it.

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**Quantum Chemistry, an Introduction.** Walter Kauzmann. Academic Press, New York, 1957. 744 pp. Illus. \$12.

The author of this book set out to produce an elementary textbook. In this he has succeeded, with some spectacular pedagogical features. Mathematical operations for important elementary topics are written out in unusually great detail, and all pertinent mathematics is presented in connection with extremely clever examples from classical mechan-

ics before quantum mechanics is introduced. Because of the patient presentation of the mathematical methods and because of detailed discussions of concepts, this adds up to a long book: 744 pages of small and very small type, 230 problems, 254 references, 158 figures, 47 tables, and more than 2800 equations. In spite of its length, the book is less complete in coverage, less useful as a handbook to the chemist who is using quantum mechanics in his research, and less complete in the presentation of details of advanced topics than are certain other textbooks in this field. However, as an introductory textbook for the average senior or graduate student in chemistry, this book has many extremely attractive features, and it should be widely useful.

In the first 150 pages there are problems in classical mechanics which give rise to the same mathematical operations that are met with later in quantum mechanics. For example, surface harmonics, including  $s$ ,  $p$ ,  $d$ ,  $f$ , and so on, notation, is introduced in terms of the normal modes of vibration of the ocean on a completely flooded planet. Also a correlation diagram, in going from the normal modes of a square membrane to the normal modes of a round membrane, illustrates correlation diagrams in general, perturbation theory, and the reason for proper linear combination of degenerate normal modes. Similar illustrations are given for the variation method, symmetry operations, systems with strong or weak coupling, and so on.

With all difficult mathematical operations already covered in the treatment of easily visualized mechanical systems, the author is able to concentrate in the next 400 pages on the physical and chemical concepts of quantum chemistry. The topics covered are the usual ones: the Schrodinger equation and its exact solution and interpretation for simple systems, the uncertainty principle, angular momentum operators, atomic systems (two long chapters), molecules (two long chapters), van der Waals forces, and time-dependent processes. On these topics and problems the book is critical, stimulating, and up to date.

At this point, on page 546, we encounter a second book, based on the same plan as the first but carrying out this pattern less successfully. The subject of this second book is the quantum theory of light. The first 90 pages are devoted to the "classical theory of optics," largely the Lorentz theory of electrons and their interaction with light waves. The last chapter is devoted to patching up this theory with quantum considerations. Surely the author would have been excused if at the end of his book he had indulged himself in a short, difficult chapter on this, his field of research. Instead, we have a very long section which

attempts to make the subject simple and easily visualized; one gets the impression that this section is artificial, specialized, and not of the same polished quality as the rest of the book.

Often a student comes up with one or another of two unfortunate attitudes toward quantum chemistry. On the one hand, he may be repelled by the mathematical details; he may want a non-mathematical version of quantum mechanics; and he may memorize several words, some of them having many syllables. On the other hand, a student may work through the treatment of the hydrogen atom and a few other cases; he is thrilled by the success of the theory, and at once he wants to hang up his laboratory apron, throw away his test tubes, and start calculating the answer to his technical chemical problems. In fine philosophic passages, Kauzmann consciously combats both of these profitless attitudes. The point is firmly made that nonmathematical quantum mechanics is like dehydrated water; the student is sternly told that he must master the mathematical methods, derivations, and operations in order to understand what has been done, what can be done, and what cannot be done with present techniques. The early optimist is warned that in spite of all the mathematics one can learn and even with high-speed computers, one does not in the foreseeable future expect quantitative theoretical solutions to routine chemical problems.

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**Biochemical Problems of Lipids.** Proceedings of the second international conference held at the University of Ghent 27-30 July 1955. G. Popják and E. Le Breton, Eds. Interscience, New York, 1957. iv + 505 pp. Illus. \$10.75.

This book is a compilation of some 69 of the 80 papers presented at the second international conference. Most of these papers are in English, but quite a few are in French and German. The breadth of subjects covered by the book is indicative of the broad field of interests in lipid chemistry.

Part I is devoted to physical and chemical properties of the lipids, methods of separation, and structures. Of special interest is the article by A. T. James and A. J. P. Martin on gas-liquid chromatography as it is used in the separation and identification of methyl esters of saturated and unsaturated fatty acids. This procedure is perhaps the most exciting in the field of lipid chemistry at the moment.

Part II is concerned with metabolism

and biosynthesis, enzyme systems. The paper entitled, "Further studies on the biosynthesis of cholesterol and squalene," by Cornforth *et al.*, deserves special mention because of the probable significance of cholesterol synthesis in atherosclerosis. The final paper of this section is the report of an international committee on "Nomenclature of enzymes of fatty acid metabolism."

Part III is devoted to phospholipids and transport. Of special interest are a report by E. H. Ahrens, Jr., on "Fatty acid exchanges during fat digestion in the human intestine" and an article by M. G. Morehouse, W. P. Skipski, R. L. Searcy, and Leonard Spolter on "Absorption and distribution in the rat of lipids utilizing labelled glycerides and components." The article by J. Glover and C. Green on "Studies on the absorption and metabolism of sterols: mode of absorption" is of current interest.

Several papers in part IV are especially timely. These are "Minor constituents of unsaponifiable fractions of kidney, liver and other tissues from various species," by R. A. Morton; "Rôle de la choline à l'égard de la toxicité de certains mélanges lipides-cholestérol," by J. Raulin; "The biological value of various natural oils and fats," by H. J. Thomasson; "Function and metabolism of essential fatty acids," R. T. Holman; and, finally, "Action de l'héparine *in vitro* sur les lipides et les protéines du sérum sanguin," by Colette Magis.

It is not possible in a book of this type, covering so many subjects, to review any papers in detail. However, this volume should be on the required list for every lipid chemist and especially for graduate students working in this field.

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**Experimental Research on Ageing.** Symposium of the Biological and Medical Research Committee of the International Gerontological Association's European Section. Basel, 4-7 Apr. 1956. F. Verzár, Ed. Birkhäuser, Basel, Switzerland, 1956. 290 pp. F. 34.

This report of a symposium organized by F. Verzár and J. F. Danielli, under the auspices of a committee of the International Gerontological Association's European Section, is of special value, since the participants have presented observational data to support their points of view. It offers an excellent perspective of the interests of European investigators in research on aging.

Of the 40 papers published, the first five offer the views of R. E. Tunbridge and D. A. Hall (Leeds), I. Banga, J.

Baló and D. Szabó (Budapest), Verzár (Basel), and N. R. Joseph and F. Bourlière (Paris) on age changes in connective tissue. These papers summarize, in a lucid fashion, the areas of agreement and disagreement among these investigators. With increasing age, collagen undergoes changes which are reflected in its chemical and physical properties. Danielli and G. H. Bourne (London) considered the potential role of somatic mutations in aging and reviewed briefly age changes in mammalian tissue cells. The importance of the interrelations between the functions of cells of a given tissue with other cells of the body was stressed. Although attractive, the hypothesis that aging is attributable to somatic mutations is highly speculative, since calculations must be based on mutation rates in the germ cells in the absence of data on somatic cells. O. Mühlbock (Amsterdam) summarized data from his genetic studies on mice to demonstrate that advanced parental age reduced the frequency of spontaneous mammary and hepatic tumors in the offspring. L. Brull and C. Keil (Liège) showed that fatness in mice increased regularly with age except in extreme old age. They concluded that mice behave like human beings—they keep on eating too much after they are grown.

About 14 papers were concerned with age changes in the functional capacities of various organ systems in mice, rats, and human beings. These varied from reports on structural changes in the senile mouse ovary (P. J. Thung, Amsterdam), and age differences in the response of body temperature of the rat to cold environments (F. Hügin and Verzár, Basel), to changes in carbohydrate (W. E. J. Jessop, Dublin, and H. Baur, Basel), protein (J. Rechenberger, Leipzig), and lipid metabolism (G. Schettler, Marburg) in the human being. Arteriosclerosis was the subject of papers by E. Greppi, G. Scardigli, G. Guidi, F. M. Antonini (Florence) and F. H. Schulz (Leipzig). Other clinical studies on protein metabolism (W. Schulze, Ludwigshafen), water metabolism (O. Olbrich and E. Woodford-Williams, Sunderland), blood coagulation (T. Geill, Copenhagen), aging in the central nervous system (M. Bürger, Leipzig), vitamin treatment of mentally disturbed old people (L. Van der Horst, Amsterdam), and blood sedimentation (J. A. Huet, Paris) were also reported. V. Korenchevsky (London) developed, in detail, his theory of autointoxication as one of the causes of aging. Olbrich and Woodford-Williams were unable to reduce nitrogenous waste products in the blood by daily intravenous infusions of saline in old subjects. A. T. Welford (Cambridge) critically examined current theories of

age in learning ability. E. R. F. W. Crossman and J. Szafran (Birmingham), using card-sorting tests of increasing complexity, found that the easy tasks showed greater age differences than did the more difficult tasks. This is a new observation which led the investigators to present an interesting hypothesis based on the concept of "internal noise" in the nervous system.

Although many "old hands" in gerontological research contributed to the symposium, a number of investigators who were new to the field of aging were represented. This is an indication of the growing recognition of the importance of aging research among scientists from many disciplines.

The book offers thoughts and hypotheses about aging which should serve as a further stimulus to research. It differs from other symposia in that only minor reference is made to the discussion. The published discussion is usually limited to a series of questions with specific answers, so that the reader does not get full benefit of the thinking of the group. Unfortunately, the book does not contain a subject index. However, the volume is a "must" for anyone who wishes to be informed about current research on aging in European laboratories.

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**A Revision of the Australian Chafers (Coleoptera: Scarabaeidae: Melolonthinae).** vol. 1. E. B. Britton. British Museum (Natural History), London, 1957. viii + 185 pp. Plates. £4.

Volume I of this much needed revision of Australian chafers is presented in 185 pages, with 25 text figures and 42 plates with 499 line drawings. The volume is especially valuable, since E. B. Britton was unusually fortunate in being able to examine a high percentage of the types of Australian Melolonthinae, the British Museum itself owning at least half of the types of the 1389 known species. He was privileged also to spend the greater part of a year in Australia, studying types in the five Australian museums owning such specimens.

In the first volume, 157 of 184 previously described species are reduced to 136 through synonymy, and 67 new species are added, to bring the total to 203 species. These species, occurring on the Australian mainland and associated islands, including Tasmania, are described and presented in well-constructed keys to tribes, genera, and species.

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