
 REVIEWS

Encyclopedia of Mathematics and Its Applications, Volume 6—Permanents. By Henryk Minc. (Addison-Wesley Publishing Company, Advanced Book Program, Reading, Massachusetts 01867, U.S.A.) September 1978. Pp. xviii + 205. Price: U.S. \$ 21.50.

This is the sixth volume in the series on Encyclopedia of Mathematics edited by Professor G. C. Rota and Marvin Marcus. The importance of this monograph by Henryk Minc, an authority on multilinear algebra, stems from the fact that so far there is no complete and lucid account of the theory and properties of permanents which is an exciting area of research in combinatorics.

For those uninitiated: Permanents are functions that are defined on matrices, somewhat analogous to determinants; while a determinant is defined only for a square matrix, a permanent which is the sum of all diagonal products of a matrix is defined for any rectangular matrix.

Permanents were introduced by Binet and Cauchy in 1812. Since then there has been increasing interest in this area especially because of their applications to combinatorics, graph theory and to statistical mechanics.

The first Chapter of this book contains a historical survey. In Chapter 2, the general properties of permanents are developed. Chapter 3, deals with the combinatorial and structural properties of (0-1) matrices. Chapters 4 to 6 are the most important containing the inequalities pertaining to Permanents. The seventh Chapter discusses the computation of permanents. The last Chapter indicates applications and also lists conjectures and unsolved problems.

Finally an excellent up-to-date and complete bibliography is provided.

This reviewer considers that all these volumes of Encyclopedia are continual feast to the beginners, amateur and serious mathematicians. Every school, college and university library should acquire all these volumes.

E. V. KRISHNAMURTHY.

A Text Book of Inorganic Chemistry. (Low Cost University Edition), By P. B. Janardhan and B. Sivasankar (Oxford and IBH Publishing Co., 66, Janpath, New Delhi-110 011), 1978. Pp. xi + 809; Price: Rs. 40.

The subject matter of the book extends to seventeen Chapters. The first three chapters deal with the wave

nature of matter, atomic structure and periodic properties of elements. Chapter 4 is a brief summary of the properties and applications of the chemical elements. Chapter 5 describes the nucleus and nuclear properties. Valency, molecular structure and crystal structure are described in Chapters 6, 7 and 8. Coordination chemistry has been dealt with in Chapter 9. Chapters 10 and 11 deal with metals and metallurgy. Acids, bases and non-aqueous solvents are described in Chapters 12 and 13. Chapter 14 describes noble gases and Chapters 15, 16 and 17 deal with lanthanides, actinides and transition metals. At the end of every Chapter a number of appropriate references have been given. Inclusion of a few questions also would have been most welcome.

The book, obviously, is intended for the Master's course and includes material meant for many of the inorganic chemistry courses taught at the M.Sc. level. It would be too much to expect that any single book would fulfil the entire needs of such courses that are now being taught. However, it is certainly an effort in the right direction.

The material of Chapter 17 on transition metals would perhaps have fitted better if it had been split up and distributed suitably in Chapter 9. The claim of the senior author that Chapter 4 has been a novelty can be conceded but it is a moot point as to whether the material of Chapter 4 is not something that would fit into a notes rather than into a text book. Several statements which lack clarity may be identified in the text. For instance, on page 54, the last two lines—in place of the phrase "between two nuclei" "between two identical nuclei" would have been more meaningful. Similarly "the single bond-length in most" could be better read as "the single C-C bond-length" On page 118 the statement "In a bunch of isotopes, one with a lowest mass number, that is one which is most neutron deficient will emit alpha particles with highest energy" may not hold good always. For example, the known isotopes of radon extend from ^{204}Rn to ^{222}Rn . ^{204}Rn which is the most neutron deficient has an alpha energy of 6.28 MeV while ^{213}Rn and ^{215}Rn have alpha energies of 8.13 MeV and 8.6 MeV respectively. There are quite a few printing errors: Example—Page 14—symbol for single state, Page 302— O_2 molecule description. It is hoped that these defects would be eliminated in the next edition.

The textual material as pointed out earlier is an effort in the right direction especially when books of this type by Indian authors are almost not there. The efforts of the authors have to be commended.

G. K. NARAYANA REDDY.

Annual Review of Biochemistry, Volume 47.

Editor: Esmond E. Snell, Associate Editors: Paul D. Boyer, Anton Meister and Charles C. Richardson (Annual Reviews Inc., 4138 El Camino Way, Palo Alto, California 94306, U.S.A.) 1978. Pp. 1315. Price: \$ 18.00 in U.S.A., \$ 18.50 elsewhere.

Another issue of this series is out with 32 articles and the usual prefatory article, this time by H. A. Barker. The size is getting bigger each year. The present volume has 1191 pages of matter and 8433 references. Almost 10% of the total pages are devoted to indexes. A good number of the references belong to years before 1975. In one article on amino acids, only 30% of the references correspond to those published since 1975 making one wonder about the scope of the article. In a previous review of these series I commented that these are tending to become "Annual Collection of Reviews of Biochemistry". The present volume confirms this view. In order to make each readable on a chosen subject, the articles are restricted in their scope and the reviewer traces the developments in the area covering a whole range of publications, not necessarily recent. Such reviews are not unique and found in other series meant to bring out the newer developments in specific fields. This leads to partial overlap of the subjects treated and one gets the impression of duplication of effort. At the same time, it is to the credit of this Annual Reviews that the current important developments are well covered by them, the best way to keep abreast with the flood of new information in biochemical research, is to continue to follow these series each year. But ask the question what are the new discoveries in the year, it will be difficult to search the answer in this volume. All the same, this volume is worthy of possession and all biochemists would be benefitted to scan through the pages. As usual, there are a large number of articles on nucleic acids covering a wide range of the current intense research retroviruses, DNA replication, differentiation, proteins that affect DNA conformation, genetic recombination and transcription. The next importance is for the lipids and membrane biology—bacterial membrane lipids, probes of membrane structure, acetylcholine receptor, outer membranes of Gram-negative bacteria, photochemical systems in bacteria, sphingolipids, plasma lipoproteins and transport mechanisms.

Aspects of regulation have been covered through articles on hypothalamic regulatory hormones, nerve growth factor, amino acid biosynthesis, role of adenosine and 2-deoxyadenosine, animal cell cycle, prostaglandins and thromboxanes, translational controls of gene expression and assimilation of nitrogen compounds. There are some specialized articles such as biosynthesis of procollagen, ribosome structure, glycosaminoglycans, insect plasma proteins, fluorescence energy transfer.

Biochemistry is expanding too rapidly for any one person to keep abreast with all the developments. Annual Reviews of Biochemistry are one way to keep a glimpse of progress in biochemistry.

T. RAMASARMA.

Progress in Water Technology. A Journal of the International Association on Water Pollution Research for the Rapid Publication of Conference Proceedings that Record Important New Advances and their Applications in all Fields of Water Pollution Control Design-Operation Interactions at Large Wastewater Treatment Plants. Proceedings of the Workshop held in Vienna, September, 1975, Pergamon Press, Oxford, New York; Headington Hill Hall, Oxford OX3 0BW England, Vol. 8, Number 6, Pp. 1-554. Price: 55.00; £ 27.75 1977.

This Volume contains 59 papers, covering 554 pages. The first paper by R. Kudukis gives a brief account of the history, objectives and progress of water pollution control in the United States of America. The Water Pollution Control Act Amendments of 1972 in the United States are the culmination of great strides in the life of the United States which is preparing to celebrate its Bicentennial toward environmental quality in general and water quality in particular.

The other papers deal with aspects ranging from wastes fluctuation and effluent standards to architectural engineering approach to water pollution control plant.

In the paper on "River Standards in Thames Water Authority (2) Standards for Discharge to the Thames Tideway" by L. B. Wood, it is interesting to note how the tidal Thames, the dirtiest in the United Kingdom, has been transformed to one of the cleanest over a period of less than a quarter of a century and it was in no small measure due to the work of Water Pollution Research Laboratory (now Water Research Centre) in the United Kingdom. The results have shown the reduction in the polluting loads discharged from major works to the tideway over about 25 years, and a leaflet has been distributed, which

gives an account of the 83 species of fish now present in a river which only 15 years ago could sustain no aquatic life in the Metropolitan reaches.

Salmon fry was recently introduced into a tributary of the River Windrush (itself a tributary of the fresh water Thames). The point at which they were released was "at the exact spot where Milton wrote his "Paradise Lost". It was hoped that in 1977 the parr would go to sea and return in 1979 to "Paradise Regained"!

The paper on "Design and Operating Experiences with Canada's First Oxygen Activated Sludge Plant" by R. M. Girling and the paper on "The Use of Pure Oxygen in Single-Stage Biological Sewage Treatment Process" by L. B. Wood and D. Sheldon are also of considerable topical interest. It is now generally accepted that the rate of oxidation of carbonaceous matter is not increased by increasing the concentration of dissolved oxygen in the mixed liquor provided that aerobic conditions are maintained.

It was found that with the use of pure oxygen in the single-stage process, "the rate of growth of *Nitrosomonas* was reduced compared with that of air systems owing to a lowering of pH of mixed liquor due to dissolution of carbon dioxide".

Altogether, all the papers in the present volume are interesting and valuable, particularly to those working in the field of water research, resources and technology, pollution, hydrology and agronomy.

S. C. PILLAI.

Q. KASI VISWANATH.

Rothamsted Experimental Station. Report for 1977. Part 1 and Part 2 (Rothamsted Experimental Station, Harpenden, Herts AL5 2JQ, U.K.) June 1978. Pp. Part 1-348, Part 2-118. Price: For both parts £ 5.00 (not sold separately) (Post free).

The annual report of the Rothamsted Experimental Station for the year 1977 is published in two parts. Part I deals with the activities of the Station. Part II has a number of reports on selected topics. The first few pages of Part I consists of such details as history, financing and salient features of the earlier findings of the Station. This is followed by the activities of all the sixteen departments giving the important findings of each of the projects, list of publications, etc. Work done by the Commonwealth Bureau of Soils is also included in this part.

Part II contains seven articles written by various authors. The first two articles deal with effects of

rotation and long term fertilizer application on yields and nutrient uptake by various crops, nutrient balance in the cropping sequence, response to added fertilizers, etc. While the third article is on the species of plants in selected plots (Park grass plots) under different treatments, the fourth reports the effect of different management practices on the physical and chemical properties of Rothamsted and Woburn soils. The fifth article is a report of field and laboratory toxicity studies of almost all the insecticides on honey bees and other beneficial insects. Toxicities have been assessed under different methods of pesticide application and on different crops. This article is very useful to the farmers and research workers. The recommendations given at the end of this article are of great help in preserving honey bee colonies and other beneficial insects. The sixth article on the fertilizer use pattern in U.K. by cropwise and nutrient-wise is helpful to both fertilizer industries and fertilizer planning and development agencies and officials. Insect survey conducted through light and section traps of different parts of England forms the subject matter of the last article, and it is quite useful to entomologists, particularly insect ecologists to forecast the pest outbreak.

Part I of the report gives the information on all aspects of work done in the Rothamsted Experiment Station. Many of the studies may not be published in Scientific journals immediately, but inclusion of the salient findings during the year in this report is most useful to all the research workers, not only to compare the results but also to know the varied research activities being carried out at the oldest Agricultural Research Station of the World. This report has all the findings of the year compiled in one place. Some of the articles in Part II dealing with the long term effects of rotation, fertilizers, plant species in selected plots, etc., may not be of immediate use, but the experiments are planned to study the effects in the long run. Such compilation over years will be quite useful. Although the work done is in U.K. the results are indeed of help to other temperate regions. However, the findings of laboratory and theoretical studies are of help to all research workers throughout the world. The report has a good compilation of results and is quite useful to workers involved in all branches of agricultural research. The report is recommended for use as reference book to all the libraries of institutions engaged in agriculture and biology.

A. AGNIHOTHRUDU.