
REVIEWS

Basic Chemical Thermodynamics (Low Cost University Editions). By N. Venkateswara Rao. (The Macmillan Company of India Ltd., 4, Community Centre, Naraina Industrial Area, Phase I, New Delhi 110 028), Pp. xiii + 218. Price: Rs. 11.75.

This book on "Basic Chemical Thermodynamics" covers material usually required for B.Sc. and M.Sc. courses. The treatment is standard and classical, e.g., the chemical equilibrium is discussed with the help of Van't Hoff's box. Calculation of entropy by statistical methods as given in chapter nine is very useful. There is a good collection of solved problems in the last chapter.

Some topics like thermodynamic behaviour of real gases, nonideal solutions and partial molal quantities, if included, would make the book more useful to M.Sc. students in physical chemistry. In the entire book, there is only one data table on heats of atomisation. Numerical data on heat capacities, standard heats of formation, standard heats of combustion, standard free energies and absolute entropies in standard state of a few substances should have been included at least for the purpose of solving the numerical problems given in the book.

The book is written in a lucid style and the students will definitely find the contents of the book quite interesting.

D. D. DESHPANDE.

The Scientific Planning and Organization of Precipitation Enhancement Experiments with Particular Attention to Agricultural Needs (WMO-Technical Note No. 154). By J. Maybank (World Meteorological Organization, Geneva, Switzerland), 1977. Pp. xvi + 88. Price: Not given.

Modification of weather to man's advantage for relieving water shortages and droughts and as a weapon of war has assumed considerable significance during the last few years. It is, however, a highly controversial subject among scientists engaged in the study of cloud and rain physics and developing techniques of weather modification *via* cloud seeding. While some experiments have resulted in generally accepted rainfall increases, other equally sound experiments have been inconclusive. The natural variability of clouds, storms and precipitation together with the uncertainties concerning rain production mechanisms are responsible for these widely varying results. Therefore the

decision by the World Meteorological Organization to carry out an internationally planned, executed and evaluated experiment called the Precipitation Enhancement Project (PEP), in order to try and obtain scientifically convincing answers to the controversial question of the feasibility of artificial precipitation enhancement is to be greatly welcomed. The present Technical Note outlines the steps that might be taken on a typical attempt to establish the potential for rain augmentation in any region, for which additional precipitation might be desired, particularly for agricultural purposes. It also brings up to date an earlier WMO-Technical Note "Artificial Modification of Clouds and precipitation" issued in 1969 and contains the WMO official statement on the "Present State of Knowledge and Possible Practical Benefits in some fields of Weather Modification".

The first chapter gives a historical account of weather modification beginning with the work of Bergeron, Findeisen, Schaefer and Vonnegut in the 1930s and 1940s. The second chapter describes the steps to be taken to determine the specific needs for additional water for agricultural purposes. Chapter 3 describes how cloud resources must be assessed, a cloud climatology for the region established and nucleus, water droplet and ice-crystal inventories made. The need for carrying out carefully designed experiments before proceeding to a full-scale rain increase operation is next explained. Following it, various statistical designs are considered and the problems that are met in the planning stages discussed.

The next two chapters describe the organization and operation of an experimental weather modification programme and the estimates of capital and operational funding. Finally the evaluation steps that follow a completed experiment are described, together with considerations of future action, if the experimental results and continued water needs warrant future cloud-seeding operation. The benefit/cost ratio naturally assumes considerable importance but it is extremely difficult to assess them even roughly.

Despite our inadequate knowledge of storm climatology, cloud microphysics and cloud dynamics, and considering all the complexities that are involved, some success has been achieved by cloud seeding. Reservations concerning modification should therefore not be allowed to hinder further research into the principles and techniques that may achieve desired precipitation increase. The atmosphere contains vast quantities of

water, with much greater amounts generally flowing over a region in the air than passing through local rivers, streams and aquifers. Compared with the costs of major irrigation dams or those of crop losses through droughts, weather modification experiments and operations are very modest and inexpensive undertakings.

An excellent bibliography on all aspects of cloud physics and weather modification adds to the value of the book.

A. MANI.

Pesticide Residues. A review of Indian Work by V. Agnihotridu and M. S. Mithyantha. (Rallis India Limited, Research and Development Laboratories, Fertilisers and Pesticides Division, 87, Richmond Road, Bangalore 560 025), 1978. Pp. iii + 173. Price: Not given.

Our country has embarked upon a new agricultural strategy for increased production through the large scale cultivation of high yielding varieties which require heavy application of fertilizers and a highly sophisticated water management technique involving plentiful irrigation. With large scale deployment of these inputs, the disease and pest situation in the field of agriculture, has acquired a new complexion where a number of new and relatively unimportant diseases and pests have assumed epidemic proportions. If the annual production of agricultural and horticultural crops have to be sustained at an optimum level, chemical control of pests and diseases must be given top priority. This has been realised and the pesticide production and utilization is being given its due importance at the governmental level. Viewed against this background, the publication of this review is most timely and appropriate. The dangers posed by pesticides have been stretched to a level where they appear to be highly exaggerated. If pesticides are used with proper care and discretion, 'right quantity at the right time' the so called dangers posed by pesticides appear unfounded. The first volume on Pesticide residues was published in 1973 by Bindra and Kalra

where work on this aspect was reviewed up to 1971. Since its publication literature on the subject has grown immensely and the present review attempts to bring together some of the important developments in this vital area, from 1971-1977. The contents of the book have been divided into different portions covering insecticides, fungicides, herbicides and fumigants including grain storage pesticides. The insecticides which are produced and consumed in maximum quantity in India, occupy major portion of the book. The insecticides have been divided into sub-groups like chlorinated hydrocarbons, organophosphate, carbamate, etc. and have been dealt with in detail. In the portion dealing with fungicides, some of the recent work on systemic fungicides like beulate, carboxin and oxycarboxin have also been covered. Research work on problems of residues on fungicides, herbicides and grain storage pesticides is scanty in India and hence finds mention only on a few pages of the review.

An extremely useful feature of the review is that data pertaining to residues of pesticides on various crops grown under different agro-climatic conditions, have been presented in tabulated form. Thus Table 1 covers name of the crop, variety, location, dosage of pesticide, method of application, dissipation rate, waiting period, residues at the time of harvest and the reference. Table 2 contains data on a similar view on the effect of processing on residues. The review also deals with methods for pesticide residue analysis and contains nearly 300 systematically arranged references.

The review is a definite contribution in the area of pesticides residues and will serve as an indispensable reference book for workers engaged in research in the field of pesticides. The authors of the publication richly deserve the gratitude of all engaged in Pesticide research. Further, it is hoped that this volume will stimulate further research in this hitherto neglected area of study.

V. V. CHENULU.

AUSTRALIAN SCIENTISTS DESIGN A CHEAPER TELESCOPE

A new optical telescope, which combines three major technological advances at a quarter of the cost of a conventional instrument, has been proposed as a national facility for Australian Universities. The proposed 3-m mirror telescope, would cost \$A 3,000,000 to build, compared with at least \$A 12,000,000 for a conventional telescope of similar size. The telescope

would have a mirror only 15 cm thick and would weigh only a few tonnes. The new mount is much simpler as it allows movement in a vertical and horizontal plane unlike the equatorial mounts of conventional telescopes which have a complicated movement about an axis parallel to the earth's axis.