

## REVIEWS

Portraits of Famous Physicists with Biographical Accounts. By Henry Crew. (New York: Scripta Mathematica, Yeshiva College), 1942.

In 1937, the editor of the *American Physics Teacher*—now of the *American Journal of Physics*—appointed a committee to plan a portfolio of portraits of eminent physicists, to be published by Scripta Mathematica. The committee contained seven members. It was decided to choose twelve outstanding physicists out of the fifty names submitted for consideration. The selection was to be made from among those not then living.

In February 1938, the following names were selected—Galileo, Huygens, Newton, Ampere, Fresnel, Faraday, Joule, Clausius, Maxwell, Gibbs, Hertz and Rowland. While it is possible to suggest other names for this gallery of twelve, there can hardly be any doubt that these eminent physicists are genuinely great. The period covered by these very distinguished men extends from 1564 (when Galileo was born) to 1903 (the year of the death of Gibbs).

Henry Crew, a member of the committee, has given brief biographical sketches. Emphasis has naturally been laid in each sketch (limited to 800 words) to the outstanding work of the physicist concerned.

The portraits of the twelve distinguished men of science have been taken mostly from contemporary paintings or photographs. The reproductions are attractive and elegant. Facsimiles of letters or parts of written scientific papers are given here and there. These add greatly to the interest of the collection.

S. R. R.

*Animal Biology*. By A. J. Grove and G. E. Newell. Second Edition. (University Tutorial Press, London), 1945. Pp. viii + 678. Price 16 Sh.

The book before us is the second edition of this recent work on elementary biology first published in 1942. The need for a second edition in so short a time is itself a good indication of the very favourable reception that has been accorded to this volume.

In recent times a very notable change in the method of imparting instruction in Biology has taken place. The older method placed great reliance on the type system, a full understanding of a single species being considered the most efficient way of assessing characters that define a group. The method has the advantage that the descriptions given are very precise and often demonstrable in practical work. In actual practice, however, the type method of treatment is apt to underrate the value of comparative study and, often, the plasticity of life in the animal series and variation within orders and phyla are lost sight of. The increasing importance of the functional aspect of animal life has been indicated only in a comparatively small number of text-books.

The authors of *Animal Biology* have tried to remedy both these defects. There is a very successful combination of the type method and the comparative treatment; the relation of animal to its environment and the physiological significance of structural features noticed have received attention and emphasis where necessary. The result is an admirable work on Elementary Zoology containing reliable and up-to-date information on biological principles.

The criticisms that one may offer are more of the nature of points of view rather than defects in treatment. In the opinion of the reviewer the omission of Molluscan and Echinoderm types from Part II dealing with metazoan types is certainly a drawback in presenting a well-balanced account of the invertebrates. The sections dealing with vertebrates are particularly to be commended because it is here that the authors have brought in much advanced information on comparative anatomy in a very logical sequence and without subordinating to the description of types. In the method of treatment which most teachers adopt, comparative anatomy of vertebrates is often removed from the detailed treatment of types with the result that the subject loses much of its interest and is often gone through as a necessary rather than a logically developed theme. The departure presented here is a welcome one. The account of chordate embryology is likewise knit into a continuous account of comparative changes taking place during the development of Amphioxus, the frog, the chick and the rabbit. Part VI dealing with Genetics gives a good summary of the subject but the general treatment is not so happy as in the former sections. The last chapter of the book entitled "The Animals' Background" is an original feature and contains much essential information that is often, unfortunately, ignored. On the physiological side it is very pleasing to find the readable accounts of the physiology of sight, the mechanism of hearing, the mechanism of nerve impulses, the behaviour of endocrine systems both in Invertebrates and Vertebrates and the recent work on the physiology of excretion in relation to osmoregulation. The book is very well illustrated; many of the figures are original. A few like Fig. 34 on page 71 and those in the last chapter are not in keeping with the high quality of the other illustrations. The selection of Fig. 11 on page 29 is unfortunate as it does not show the orthodox posture of the Anopheline mosquito. The statement on page 176 in connexion with the green glands of *Astacus* that the fluid within the excretory organs is at a lower osmotic pressure than the blood is misleading; in actual fact the lower osmotic pressure is observed only in the final urine in the bladder, the initial urine being isotonic with blood. Fig. 367 on page 464 with the corpus luteum marked as an unshaded area seems to give a false idea of its structure.

This book can most confidently be recommended to teachers and students alike as a very sound introduction to the study of animal biology.  
N. K. PANIKKAR.

**Principles of Irrigation and Drainage.** By K. M. Gururaja Rao, L.A.G., Principal (Retd.), Mysore Agricultural School, Hebbal, Bangalore. (The Bangalore Press, Mysore Road, Bangalore City), 1945. Pp. 50. Illustrations 18. Price Rs. 2.

This timely publication will be found useful against the background of converging efforts of Governments to increase irrigation schemes to insure sustained crop-production against the vagaries of the monsoons. The subject is handled from the standpoint of agricultural needs down to correct methods of application of water on the fields. Books of this type serve to fill in an admirable way the *lacuna* that is growing between theoretical recommendations spread through a number of books on one hand, and the practical needs of the cultivator on the other.

The subject is clearly analysed and presented in five chapters under Irrigation, and four under Drainage. They deal with various aspects of the subject such as: History of irrigation and advantages, soil in relation to irrigation, three ways how water is held in the soil, sources of irrigation water, duty of water, water-lifts, and nine methods of field irrigation. The subject of drainage consists of: Nature of soil in drainage, kinds of drainage, surface "Run-off" of water, discharge-coefficient, different kinds of drains and benefits of sub-surface drainage. There is a small chapter on Alkali soils, with a few suggestions for reclaiming them.

The contents of this attractively got-up volume represent the exceptionally rich and valuable experience, which the author was able to gain during his twenty-five years of intimate association with large-scale irrigation farming; the publication will be welcomed as a practical handbook on the subject.

**Animal Colony Maintenance.** By E. J. Farris, F. G. Carnochan, C. N. W. Cumming, S. Farber, C. G. Hartman, F. B. Hutt, J. K. Loosli, C. A. Mills and H. L. Ratcliffe. (*Annals of the New York Academy of Sciences*, 46, Art. 1. Published by the Academy, New York), 1945. Pp. 126.

Recent advances in physiology, pathology, pharmacology and particularly in nutrition are largely based on results obtained through animal experimentation. The increasing use of animals for research in these fields calls for the scientific maintenance of a healthy, clean and vigorous stock showing little or no variation from colony to colony. A standardized animal is to the biologist or to the nutritionist what the pure chemical is to the chemist. It is not often recognised that the animal is a delicate bit of apparatus and that the maintenance of a reliable and healthy colony is a complicated problem demanding considerable experience and care. The difficulty of the problem is illustrated by the fact that the simple removal of rats from one building to

another may stop breeding for several months. The various aspects of the problems involved were ably discussed at the recent Conference on Animal Colony Maintenance organised by the New York Academy of Sciences, each aspect by a specialist in the field. Six topics are dealt with: genetic purity, mating of mammals, feeding of laboratory animals, environmental influences, infectious diseases, and financial considerations.

The six papers presented at the Conference together with the discussion they provoked have now been published in book form. The introductory speech by Dr. Farris of the Wistar Institute is also included. The papers are all of a high scientific order and are fully referenced. The proper feeding of the various species of laboratory animals and their requirements of the various dietary essentials are dealt with as thoroughly as the many intricate details concerning their oestrus cycle. The infectious and parasitic diseases of laboratory animals are also amply dealt with. The financing of animal colony maintenance has been considered both from the point of view of research organisations and of the commercial breeder. So far as India is concerned, the commercial breeder is almost non-existent, and perhaps rightly so. Most research organisations maintain their own animal colonies reared successfully through generations, and as such the commercial breeder may not have much encouragement.

The book is a mine of information and should prove extremely useful to those concerned with animal experimentation.

S. RANGANATHAN.

**Further Work on Plant Injection for Diagnostic and Curative Purposes.** By W. A. Roach and W. O. Roberts. (Imperial Bureau of Horticultural and Plantation Crops. Technical Communication No. 16), 1945. 1s. 6d.

At the East Malling Research Station, Kent, England, work on plant injection for diagnostic and curative purposes is being carried out by Dr. Roach and his collaborators for the past many years. In 1938, Dr. Roach surveyed the whole work of plant injection giving details of technique used by himself and others in Technical Communication No. 10, of the Imperial Bureau of Horticultural and Plantation Crops. Since then much advance has been made in the technique by workers in this field and if it were not for the stress of war the Imperial Bureau of Horticultural and Plantation Crops would have brought out another technical communication reviewing the whole work up-to-date. Since this was not possible under the present circumstances, Roach and Roberts in Technical Communication No. 16, have had to confine themselves only to a description of the improvements effected in the injection technique by the East Malling group of workers.

The authors have furnished a list of solutions together with their concentrations which have given responses when tested on a number of plants. The use of these solutions may require modifications when work is done on new kinds of plants. A detailed description is given of the *inter-veinal* and *leaf-stalk* injection.

tion methods which have proved so successful. Since the appliances required for plant injection work are small and require care in handling, details of their construction are given and very clearly illustrated with several text-figures. The results of the extensive work of the authors and their collaborators on plant injection have been briefly summarised in respect of twenty-five different kinds of plants which mainly consists of fruit trees and vegetable plants.

The technique adopted for injection for curative purposes is dealt with under the two

heads, *injection of liquids* and *injection of solids*. The latter method being necessary in the case of trees that cannot absorb fluids. The injection of solids necessitates drastic operation on the trees yet it is less elaborate, requires fewer appliances and is more easily carried out.

The techniques described in the communication under review are an improvement over those previously used and described and will be found by workers in the field easy of application.

L. S. S. KUMAR.

## SCIENCE NOTES AND NEWS

### THE AGE OF THE PUNJAB SALINE SERIES

In the course of his Presidential Address to the National Academy of Sciences at their Annual Meeting held at Hyderabad (Deccan) in December 1943, Prof. Birbal Sahni of Lucknow reported the discovery of numerous microfossils, mostly plant remains, in the rock salt and Kallar of the saline series, as also in the associated gypsum and oil shales; and having satisfied himself regarding the undoubted *in situ* character of these fossils, Prof. Sahni pointed out that the testimony of these fossils was obviously entirely opposed to any idea of the saline beds being so old as the Cambrian; it was clear on the evidence of these fossils, he said, that the beds were certainly Tertiary, and probably belonged to the Eocene period. Prof. Sahni's researches in this field have been more intensively pursued from various aspects during the year 1944, and a full review and discussion of the entire evidence he has collected was embodied in his Presidential Address to the National Academy at their Poona meeting held in December 1944.

In view of the fact that the problem of the age of the saline series is one of the oldest major controversies of Indian Geology, and has "exercised the brains of some of the foremost geologists who have laboured in this country", Prof. Sahni's recent work naturally attracted considerable attention at once and stimulated a thorough review and discussion of all the available evidence—stratigraphical, structural, and palæontological—bearing on this question of the Cambrian *vs.* the Eocene age of the Punjab salt. A special Symposium on this subject was organised at Poona in December 1944 under the joint auspices of the National Academy of Sciences, and the Indian Academy of Sciences, and the papers read at this important meeting have been just published in the *Proceedings of the National Academy* (Section B, Vol. 14, pt. 6). Among the contributors to this symposium, the names of practically all the leading workers in this field appear—C. S. Middlemiss, E. H. Pascoe, C. S. Fox, D. N. Wadia, E. Lehner, E. S. Pinfold, and L. M. Davies,—and there are, in addition, two valuable contributions by E. R. Gee to whom "we owe the most detailed survey of the salt range area since the time of Wynne".

It is hardly possible in the course of this

short review to refer to the points raised and comments made by these authors; a perusal of their papers will serve to show how sharply and strongly the opinion is still divided on this question. The whole problem "is again in the melting pot", and the controversy is becoming positively exciting. The Symposium is to be continued at a joint meeting of the Academies to be held at Udaipur in December 1945; and all geologists will be keenly looking forward to the further developments in this field in the hope of arriving at a really final solution of this most intriguing and tantalising problem in Indian Geology.

### MAGNETIC NOTES

Magnetic conditions during August 1945 were slightly less disturbed than in the previous month. There were 21 quiet days and 10 days of slight disturbance as against 19 quiet days, 11 days of slight disturbance and 1 day of moderate disturbance during the same month last year.

The quietest day during the month was the 9th and the day of the largest disturbance the 22nd.

The individual days during the month were classified as shown below:—

Quiet days	Disturbed days
	Slight
1, 3-5, 7-11, 16-21, 23-25, 29-31.	2, 6, 12-15, 22, 26-28.

No magnetic storms occurred during the month of August 1945, while one disturbance of moderate intensity was recorded during August 1944.

The mean character figure for the month of August 1945 was 0.32 as against 0.42 for August 1944.

A. S. CHAUBAL.

### ERRATA

In the note entitled "A Note on Hotelling's  $T^2$ ," appearing in Vol. 14, No. 7, July 1945 issue, in page 173, column 2, delete the 13th line reading "industrial and technical establishments trough".