

REVIEWS

Flood Estimation and Control. Third Revised Edition. (Chapman & Hall), 1955. Pp. xiii + 187. Price 35 sh.

As the cover flap of the book very prominently displays, the flood problem most certainly remains of the greatest importance to civil engineers who have to design reservoirs, flood-water channels, roads and other projects. The book, it is added, has been specifically designed to aid them in their work.

The book opens out with an introductory chapter describing the complicated nature of the flood estimation problem. It also lists the various possible methods of obtaining dependable solutions. Statistical methods are mentioned as offering the most reliable solutions; but on account of scantiness of data relating to floods, fuller consideration of the methodology is not followed up as lying outside the scope of the book. Instead, the author proceeds to devise a broad mathematical approach which yet retains its practicality in form by severely limiting the number of coefficients to express only the variations of the major factors. Starting from the universal canal flow formula:

$$V = c \sqrt{rs}$$

the central theme of the approach consists in developing an expression for the period of concentration of the flood arising from a storm over the catchment. Five of the six major factors listed earlier find expression in the principal formula evolved. So far, the approach seems straightforward. It is only when the author proceeds to demonstrate the application of the formula that the relative importance of the various factors size up differently and the field gets widened. Thereupon the author makes several reservations, but these help only to further restrict the scope and usage of the formula(s).

The author's earlier formula $f(a)$ for the ratio of the average to maximum rainfall intensity in terms of the area covered by a storm may be mentioned as an instance in point. Correctly speaking, the relation cannot be said to have been established with any consistency. The whole ground seems very slippery when the author feels constrained to remark, "the wide variation between the results of individual storms gives rise to some doubt as to whether any definite relation can be established

between rainfall intensity and area; on the other hand, the close similarity between the range of percentage intensity and also between the average percentage of the northern and southern groups appears significant and suggests a relationship".

The readers too are possibly not convinced. To generalise from such slippery premises or to evolve a theory therefrom does not augur well until positive proof is produced otherwise of its soundness. While "the general results" may "not be materially affected" by any slight modification of the author's curves, etc., it will be equally necessary to remember that there may be other approaches which provide similar or better estimates in individual cases.

Again in describing in Chapter VI the detailed procedure for evaluating the six coefficients descriptive of the major factors' variations, particularly the C and K coefficients of any individual catchment, it is rather disappointing to find the author concluding "catchments vary so greatly that it is impossible to do more than generalise on the subject . . .". The import of the remark is not very far from stating the tough problem back in its original form.

Chapters VII to IX again follow the straightforward pattern of constructing the flood hydrograph with the help of the formulæ developed early in the book. The effects thereon of variations of the several coefficients are also described but they rather lend a touch of hypotheticalness to the treatment despite its systematic thoroughness otherwise.

Comparisons are made in Chapter X of the flood data recorded in four instances for the basins named with corresponding estimates deduced from the theory developed. The conclusions drawn are tentative and are not sufficiently convincing. As the author himself has aptly summarised, "much further data and research are evidently required" to get better satisfactory coefficients or formulæ. Till then not much progress can be claimed to have been achieved in solving the intricate flood estimation problem.

Much useful discussion is contained in the last three chapters of the book, namely, on Flood Control; Floods in Relation to Soil Erosion; and Examples in Flood Calculation. The table presented in Appendix I for the values

of $t^3/t+1$ for aiding the computation of the time (t) of concentration by inverse interpolation will prove immensely useful for the field staff engaged in estimating and regulating flood run-offs.

D. V. JOGLEKAR.
G. M. PANCHANG.

Analysis of Bistable Multivibrator Operation. (*The Eccles-Jordan Flip-Flop Circuit.*) By P. A. Neeteson. (Philips Technical Library, Series on Electronic Valves, Book X), 1956. Pp. 82. Available from Philips (India) Private, Ltd., Calcutta. Price Rs. 8-12-0.

The monograph under review has been originally written as a Doctoral Thesis at the Technical University of Delft and is now published as a volume in the Series of Electronic Valves of the Philips Technical Library. It deals with the 'flip-flop' circuit first developed by Eccles and Jordan as far back as 1919 but which has found widespread application in the last decade in a variety of electronic circuits, such as computers, scalars, etc.

In the analysis of such a circuit, it has been conventional to consider the static condition when the circuit is at rest. But from the point of view of triggering speed and sensitivity, which are essential parameters in any practical circuit and of far greater interest, is what happens to the multi-vibrator during the time it is switching over from one stable state to the other. Such a dynamic analysis has to take into account three distinct phases: At any instant $t < 0$, Tube I is conducting and drawing grid current. When the trigger pulse is applied at $t = 0$, both the tubes become non-conducting in a short time depending on the tube characteristics and circuit components. The second phase starts when Tube II begins conducting with increasing anode current and the third phase commences when grid current starts to flow in Tube II causing new transients to be superimposed on those resulting from the preceding two phases.

The analysis of such a circuit is performed with the following assumptions regarding the shape of the trigger voltage, its amplitude and slope of the negative-going wave front. The voltage between grid and cathode of the conducting tube is taken as zero which is very nearly so when it is drawing grid current. The internal resistance of the supply voltage and trigger voltage source is neglected which is valid in most practical cases. The anode and grid capacitances of each tube are neglected to simplify the analysis, but all other tube, wiring

and stray capacitances are considered. With these valid assumptions, the static and dynamic analysis of the circuit is carried out, which enables the influence of the tube characteristics, circuits components and pulse shape on the trigger sensitivity to be computed. Further, an approximate idea of the maximum triggering speed is obtained from the analysis. Finally, some considerations in designing such circuits with high trigger speed, high sensitivity, high stability and low power consumption are outlined. In fact, the investigation, says the author, was prompted by a practical problem and has resulted in the development of special tubes for pulse work.

Considering the need for a thorough knowledge of the multi-vibrator circuits on the part of all electronic engineers, the book will be read with profit and interest by all communication engineers and computer designers. The get-up and format conform to the high standard of the other volumes in the series.

RAM K. VEPA.

Automation in Theory and Practice. (A Course of Lectures organised by E. M. Hugh-Jones.) (Oxford, Basil Blackwell), 1956. Pp. 134. Price 12 sh. 6 d. net.

The contents, which is a collection of seven lectures delivered by experienced personalities, will be of interest largely to trade unionists, business consultants, sociologists and economists. The first three lectures have a scientific and industrial touch about them and convey popular expositions of terms like feed-back, automatic pilot, time-lag, damping, control systems, etc., with suitable illustrative examples. The remaining chapters are wholly devoted to the reaction that the development of automation may have on trade unions, and on administrative, social, and economic structures. These chapters offer useful and interesting reading, especially to the economist. It is doubtful if the contents of the book will justify the title that it bears. A student of science and technology would wish that a title more appropriate to the contents could have been chosen.

S. HARIHARAN.

Eels—A Biological Study. By Leon Bertin. (Cleaver-Hume Press, London), 1956. Pp. vi + 192. Price 25 sh.

There are very few books written exclusively on one particular fish and few fishes deserve this distinction as the eels do. Their entering

rivers early in life and growing into long, stout, snake-like creatures which years later swim down the rivers into the sea to reproduce, their value as food and the capacity they possess in adjusting their physiology to suit life in both fresh-water and marine, and their capacity to make long journeys in land and away into the sea, have challenged the intellectual curiosity and excited the wonder of men of all lands. We are far from possessing answers to all the questions they raise. However, Leon Bertin's effort to bring together the findings of different authors relating to different species of eels in the world deserve our gratitude. His simple language and clear presentation will render his book readable even to those not familiar with technical terms.

Of course it will be several generations before we have a complete picture of the physiology of all the aspects of the life of fishes, especially the eels. Centuries may go by before we understand the migratory instinct of animals like fishes, birds and mammals. Nevertheless periodical reviews of our progress are of value at least in showing the loose dangling ends. Notwithstanding the fact that the author has not referred to *Anguilla bengalensis* and other eels of Indian waters, the book must be read by every student of zoology and every person who has an interest in natural history. Now that universities in India are realising the educative values of giving a scientific background to students who opt for studies in humanities, books dealing with general biology such as Leon Bertin's must be on the shelves of all the colleges.

C. P. GNANAMUTHU.

Aureomycin (Chlortetracycline). By Mark H. Lepper. Foreword by Henry Welch and Felix Marti-Ibanex, Antibiotics Monographs No. 7. (Medical Encyclopædia, Inc., New York.) Pp. 156. Price \$4.00.

This is the seventh of the series of the monographs brought out under the editorship of Welch and Marti-Ibanex and to be followed by eight more. Aureomycin is the first of the broad-spectrum antibiotics to be discovered and it has excited particular interest because of its action on the Rickettsia and some viruses. It is naturally more extensively studied than its younger brothers, terramycin and tetracycline. This monograph gives, in a space of 117 pages, what one has to know about this antibiotic in relation to clinical use, under the headings: History and Physical and Chemical Properties; Antimicrobial Activity; Pharma-

cology; Experimental Infections; Principles of Chlortetracycline Therapy; Infections Caused by Gram-Positive and Gram-Negative Cocci; Gram-Positive Bacterial Infections by Gram-Negative Bacterial Infections; Spirochetal Infections; Rickettsial Infections; Infections Caused by Viruses of the Lymphogranuloma-Psittacosis Group; Protozoal Infections; Fungal Infections; Infections of Unidentified Etiology; and Chlortetracycline in Prophylaxis. What is given is not a mere compendium but a very concise and critical appraisal of the data available by an authority. There is a bibliography of 32 pages listing 769 references and a very valuable index running to six pages. The reviewer considers this to be the best monograph he has gone through; and in this one sees both the wood and the trees. This monograph is bound to be of great value to the clinician and the researcher.

Scanning the references rapidly, one finds that about 90% of them are from America. From the rest there are 32 references from Britain, a dozen from Scandinavian countries, 6 from Germany and a few each from other countries including two from India. Antibiotic research and development still appear to be the privilege of the Americans.

K. GANAPATHI.

Crop Pests and How to Fight Them. (Published by the Directorate of Publicity, Government of Bombay, Bombay), August 1956. Pp. v + 204. Price Rs. 2.

The present handsome brochure, which is the outcome of a collaboration between the Directorates of Publicity and Agriculture of the Bombay State, affords clear proof of the recognition given to the importance of pest control in our national economy. During the years that followed the Second World War, there has been a growing awareness of the role of scientific plant protection in the context of fighting chronic food shortage. Plant protection services have been established at the Centre and in the various States for helping the cultivators to fight pests and diseases of crops and for undertaking concerted measures against pests like the locusts and the army worms, which often transcend State boundaries or affect wide areas.

The advent of modern synthetic insecticides, like DDT, BHC and Parathion, has perforce opened a new chapter in plant protection techniques. Common pesticides formerly in vogue, like the arsenates, tobacco decoction and

copper sulphate, although they carried health hazards, were types whose properties were well understood. The new products now available in the market are insecticides which are more insidious in their action, and have to be handled with particular care, if untoward consequences to the operator and the consumer are to be avoided. In view of the spectacular effect of some of these insecticides, they have become attractive to the cultivators and it is essential to provide technical guidance to the users to prevent mishaps.

The appearance of this handbook is, therefore, quite opportune and is to be welcomed. Written in simple and popular style, by the various members of the Bombay Entomological Section, the brochure covers almost the entire ground of the information needed by Departmental Field Officers and literate farmers in tackling their crop protection problems.

The first five chapters are devoted to general information about insect pests and about various insecticides recommended for use against insects. Chapters VI to XVI are devoted to the important pests of various crops, with notes on their distribution, habits and methods of control. Chapter XVII concerns locust control, Chapter XVIII treats of termites, Chapter XIX is about field-rats and other noxious wild animals and Chapter XX gives information on Sprayers and Dusters. The Appendices give practical hints on the steps to be taken in dealing with infestations and on the dosage of the various insecticides when applied on a field scale. A glossary of the common names of the different crop pests in the three languages prevalent in the Bombay State is appended. The booklet is well illustrated and includes four composite colour plates of pests.

In a popular publication of this kind, it is perhaps inevitable that some useful items of information such as a conversion table of weights and measures have not found a place. Parathion compounds, which have of late come largely into the picture, find no mention. It would have been a better plan to mention the scientific names of the pests in the body of the text, as that would have given an element of definiteness in respect of their identity, instead of obliging the reader to refer to the glossary for the information. An index at the end might have been a useful addition.

In Chapter I, the figures given in respect of the number of individuals to be found in locust swarms would seem to be underestimates, erring too much on the safe side; and there appear to be also a good number of printing

and other errors in the body of the text. But these do not in any way detract from the real usefulness of the handbook under review.

D. S. RAO.

Antibiotics in Nutrition. (Antibiotics Monograph No. 4.) By Thomas H. Jukes. (Published by Medical Encyclopædia, Inc., New York), 1955. Pp. 128. Price \$4.00.

The volume under review summarises critically the work done for nearly a decade on the nutritional aspect of antibiotics relating to humans, animals, birds and insects, and the particular effect antibiotics exert on bacterial metabolism. Just how important the developments are economically may be gauged from the author's comment: 'Never before has a medicinal drug been used in animal feeding or in the diet of humans to stimulate nutrition and promote speed and extent of growth.' The volume covers 400 references and the facts thus accumulated has been discussed in a masterly way.

The book is divided into five chapters; the introduction discusses the established chemical structures of a variety of antibiotics, particularly penicillin, streptomycin, chlorotetracycline (aureomycin) and oxytetracycline (terramycin) and bacitracin. Reference has been made to the significant effects of these antibiotics on bacterial metabolism. The increase in the growth rate of animals has been attributed to the suppression of the harmful bacteria that animals harbour in their gastro-intestinal tract.

The second and third chapters are devoted to the discussion of the mechanism of growth due to the antibiotics and the influence of the antibiotics on the alteration in the requirements of nutrients. It has been pointed out that the inclusion of an antibiotic in the diet has little effect on certain vitamins, minerals and proteins so that considerable saving in the quantity of the diet could be secured. A higher growth rate may also be achieved in farm animals, with a view to enhance meat production.

In the last two chapters, the author discusses the role of antibiotics in animal nutrition and production as also a few of the physiological effects.

The role of antibiotics in improving the carcass quality as well as the meat value has also been indicated. Elaborate discussions on the applicability of antibiotics in the rearing of domestic animals, such as swine, cattle, sheep

and goats and poultry for speedy meat and egg production is particularly interesting to the veterinarian.

The lucid presentation of the enormous amount of available data in a book of this size is really creditable, and the book will be a useful addition to the library of medical and veterinary institutions alike. The get-up of the book is in consonance with the other publications of the series.

R. L. KAUSHAL.
B. BHEEMESHWAR.

Books Received

The Adrenal Cortex. By I. Chester Jones. (Cambridge University Press), 1957. Pp. x + 315. Price 37 sh. 6 d.

The Cathode Ray Oscilloscope—Circuitry and Practical Applications. By J. Czech. (Philips Technical Library. Available from Philips Electrical Co., Ltd., 7, Justice Chandra Mahab Road, Calcutta-20), 1957. Pp. xii + 340. Price Rs. 29-4-0.

Structure Reports for 1940-41. Edited by A. J. C. Wilson. (International Union of Crystallography, N. V. A. Oosthoek's Uitgevers, MIJ, Utrecht.) Pp. viii + 384.

Hydromedusæ from the Discovery Collections. By P. L. Kramp. (Cambridge University Press.) *Discovery Reports*, Vol. 29 (1957). Pp. 128. Price 63 sh.

The Water Relations of Terrestrial Arthropods. (Cambridge Monographs in Experimental Biology, 5). By E. B. Edney. (Cambridge University Press), 1957. Pp. vi + 108. Price 15 sh.

The Physiology of Reproduction in Fungi. (Cambridge University Press.) Pp. 128. Price 15 sh.

Interscience Tracts on Physics and Astronomy No. 4—*Magnetohydrodynamics.* By T. G. Cowling. (Interscience Pub.), 1957. Pp. viii + 115. Price \$ 3.50.

Encyclopædia of Chemical Technology, Vol. XV. Edited by Raymond E. Kirk and Donald F. Othmer. (Interscience Pub.), 1956. Pp. xiv + 936. Price \$ 30.00.

Methods in Enzymology, Vol. III. Edited by S. P. Colowick and N. O. Kaplan. (Academic Press Inc.), 1957. Pp. xxiv + 1154. Price \$ 26.00.

Semimicro Qualitative Organic Analysis. By N. D. Cheronis and John B. Entrikin. (Interscience Pub.), 1957. Pp. xiv + 774. Price \$ 9.00.

SCIENCE NOTES AND NEWS

Leaf-Spot of Turmeric (*Curcuma longa*)

Sri. D. N. Borthakur, Department of Botany, Assam Agricultural College, Jorhat, writes: A severe leaf-spotting of the turmeric plants have been observed in several places of Assam during the past few years. On isolation and examination, the organism was found to be *Colletotrichum curcumæ* (Syd.) Butler and Bisby. This is the first record of the disease from Assam.

The disease has been recorded in India previously, and it has also been studied, particularly in the Madras State. The organism was originally referred to the genus *Vermicularia*, but was later transferred to *Colletotrichum* by Butler and Bisby ("The Fungi of India"—Sci. Monograph of the Imperial Council of Sci. Research, 1928).

"Atoms for Peace" Award, 1956

Prof. Niels Bohr has been awarded the "Atoms for Peace" Award for 1956, carrying with it an honorarium of \$ 75,000 made by the

organization of that name which was set up in 1955 as a memorial to Henry and Edsel Ford. Prof. Bohr, who is one of the foremost nuclear physicists of the present day, is the first recipient of this signal honour.

International Conference on Radio-Isotopes

An International Scientific Conference on the Use of Radio-Isotopes in Research will be held under the auspices of the UNESCO in Paris during September 1957. The Conference will work in two main sections. The first will deal with the role of radio-isotopes in the field of physical sciences such as geology, geophysics (including meteorology and oceanography) and metallurgical and industrial research, while the second will take up the use of radio-isotopes in biochemistry (including plant biochemistry and photosynthesis), human and animal physiological research, nutrition research, basic medical research and certain branches of agricultural research including soil fertility, plant and animal pathology and the use of insecticides.