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## REVIEWS

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Time Bases (Scanning Generators). By O. S. Puckle, A.M.I.E.E. (Chapman and Hall, Ltd., London), 1943. Pp. 204. Price 16sh. net.

Time Base is the name given to those electrical devices or circuit arrangements which produce deflection potentials of suitable types for cathode-ray tubes as employed in the television or oscillograph techniques for visual observation of electrical phenomena. These potentials are made to vary at known rates with time, and hence the modern name. For television purposes as also in many applications of the oscillographic work, the familiar "Saw-tooth" time base is employed in which the rate of change is made linear with time. In case of special kinds of oscillographic work electrical circuits have been developed giving potentials varying with time in a sinusoidal, circular, radial or spiral manner as the nature of the work demands.

Time base can aptly be described as the "brains" of the whole cathode-ray oscillograph outfit in that it decides how a recurrent electrical phenomenon will appear on the fluorescent screen. Its choice "may make all the difference between success and failure" as the author says in the introduction. In spite of the fact that developments on the time bases, trigger circuits, etc., have been largely responsible for the versatility of the cathode-ray oscillograph in its manifold uses, one does not find them adequately treated in any book published so far on the subject. Need, therefore, has keenly been felt for a unified treatment in one place of the underlying principles and common-sense involved in the design, construction and uses of such circuits. The book under review does more than fulfil this hope. In a series of enlightening chapters and appendices it gives a coherent account of the basic theory in the evolution and development of various kinds of time bases, their designs and modifications, etc., in proper historical perspective.

The book is divided into ten chapters and seven appendices. The reviewer feels that the scope of the matter covered by the book can be properly gauged by giving the chapter headings which run as follows:—

I. Introduction, II. Time base wave forms, III. Types of time base, IV. Trigger circuits, V. Blocking oscillators and inductive time bases, VI. Polar co-ordinate, multiple and velocity modulation time bases, VII. Linearization of the trace, VIII. Push-pull deflection, IX. The synchronization of time bases, and X. The use of a time base for frequency division.

For consistency of the treatment several important topics are dealt with in a series of appendices; they are vital to the main subject. For instance, a short description of the advanced aspects in the design of cathode-ray tube is given in Appendix I; the remaining six being devoted to, respectively, the curvature of the charging characteristic, the charac-

teristics of a gas-discharge triode as a time base discharger valve, differentiating and integrating circuits, the generation of square waves, a method of changing the phase of a sinusoid and the effect of large shunt capacitances in the anode circuit of a valve.

A short bibliography and an index are given at the end.

A number of neat circuit diagrams and a few plates illustrate the volume.

The author who is a research engineer with Messrs. A. C. Cossor Ltd., London, is a well-known exponent of this art of electronic jugglery and is himself responsible for devising a few of these circuits; particularly, the hard valve time base which has extended the frequency limitations of the utility of the cathode-ray oscillograph from 50 kc./s. to 1000 kc./s. It is interesting to mention here that recent development of the deflection modulated type of tube, called the signal converter, is reported to have resulted in an all-round improvement in the cathode-ray tube performance.

The book is critically written—a virtue most essential to works of this type yet not often found. It essentially describes the technique as developed by the British with a few German and American circuits "thrown in" for the sake of completeness. It is free from misprints and errors. It is a fine example of its kind, authoritative, accurate and compact, but clear and cleverly written. The author has earned the gratitude of numerous workers in this field who will do well to assimilate the book rather than try to skim through.

It is indispensable to those interested in the electronic art and science. N. B. BHATT.

Switchgear Practice. By Arthur Arnold. (Chapman & Hall, Ltd., London), 1942. Pages 238 + iv. Price 22/-.

In recent years developments have been rapid and are still proceeding in almost every kind of switchgear, and a survey of practice, a sort of stock-taking as it were, is certainly useful from many points of view. This book by Mr. Arnold is a brief review of that kind and is, therefore, welcome. Again, consideration of switchgear enters into every industry and quite often engineers with very little or no experience in this field are called upon to deal with matters concerning its design, installation and operation. To them this book should serve as a useful guide as it enables them to some extent to appreciate aspects involved in the selection of switchgear.

The scope and aim of the book can be best understood by a perusal of the headings of the nineteen chapters into which the book is divided. They are: D.C. Circuit Breakers; Specialised D.C. Circuit Breakers; D.C. Motor Starters; D.C. Switch Boards; A.C. Circuit Breakers of Small and Medium Size; A.C. Motor Starters; A.C. Busbar Layout; A.C. Switchgear Types; Heavy Duty Circuit Break-

ers; Arc Control Devices; Isolation and Bus Selection; Methods of Circuit Breaker Operation; Interlocks; Switchgear Testing; Protective Devices on Switchgear; Instrument and Control Boards; Lightning Arresters; Fire Prevention and Protection; Oil-less Circuit Breakers. Each chapter is independent in itself and contains useful and up-to-date information on the topic selected. On account of the vastness of the field sought to be covered and the space limitations of a book of this size, rigid selection of the material is inevitable, but it can be confidently said that no material point has escaped notice. A comprehensive list of all relevant B.S.S. and a fairly representative bibliography on the subject given at the end of the volume, are useful additions.

S. KRISHNASWAMY.

**Electrotechnics**—*Journal of the Electrical Engineering Society*, Indian Institute of Science, Bangalore. Nos. 15 and 16, 1943.

We have received a copy of the current year's issue of this Journal. As the organ of the Electrical Engineering Society of the Indian Institute of Science, Bangalore, this Journal is known for the high standard of the articles published and we are glad to note that the issue under notice has maintained that standard. It contains thirteen well-thought-out articles of interest to the Electrical Engineering profession, mostly by Engineers with experience in the field they write upon. Editorial, Correspondence, Book Reviews, and News and Notes are among the other items.

It is a pity that no issue of this useful Journal could be brought out last year. We hope that its publication will go on uninterrupted from now on.

S. K. S.

**The Carnivorous Plants.** By Francis Ernest Lloyd. (Chronica Botanica Co., Waltham, Mass.; Calcutta: Messrs. Macmillan & Co., Ltd.), 1942. Pp. xvi + 352, 38 plates and 11 text-figures. Price \$6.00.

The book under review, a monograph on the carnivorous plants, coming, as it does, from one who has devoted much valuable time in delving into the mysterious ways of the plants in question here, Prof. Francis Ernest Lloyd, Professor Emeritus in the McGill University, Canada, is an authoritative work, and its great usefulness to research workers in this field and to interested botanists in general must at once be recognised. Its appearance in print is most welcome, and Prof. Lloyd has spared no pains to make the account quite comprehensive and up-to-date.

Of the carnivorous plants, there are, excluding certain fungi, about 500 species representing fifteen genera of the flowering plants, and these fall into two groups, one under the Chloripetalæ, and the other under the Symptetalæ. Thus the peculiar and the very aberrant mode of nutrition exhibited by these plants must have been derived at least along two independent lines in the course of the phylogenetic history of the flowering plants.

The structural details exhibited by these

plants and the exact mechanism involved in the capture and digestion of the prey are so many and so varied and complex, that it is hard to find one who could do justice to the subject other than the author himself. He classifies these plants into two major categories, the first where the traps are passive, with pitfalls, snares and fly-paper mechanism, and the second with active traps which display special movements necessary or contributory to the capture of the prey. In the different chapters of the book the carnivorous plants which come under these two groups are dealt with separately and in great detail.

In some, as in *Heliamphora*, *Darlingtonia* and *Pinguicula*, the digestion of the prey is brought about by bacteria contained in the pitcher fluids, whereas in a few others, as in *Sarracenia* and *Cephalotus*, the digestion is mainly due to the secretions from the glands, although bacteria may aid to a certain extent. In *Nepenthes* there are two enzymes—a catheptic and a tryptic—concerned in digestion, but there are also large numbers of bacteria in the pitcher fluid and these may only play a very secondary role.

After giving a resumé of the several interpretations regarding the morphology of the pitcher leaves in *Nepenthes*, Prof. Lloyd draws attention to the many interesting structural features of the pitchers and their role in ensnaring the unfortunate victims. And here it is interesting to refer to his observations. The insects walking on the lid of the pitchers run no risk of capture. "On the rim", however, it is supposed that they do. As a matter of fact, however, they do not, for they walk on it in any direction with rapidity, and they frequently stop to take the nectar from the marginal glands. They even passed underneath the rim and back several times in one excursion without danger. If, however, they venture on to the waxy zone they at once display a quite different behaviour. They cannot then by any chance move rapidly forward. If they progress at all, it is very slowly and with much groping with the legs as if searching for a hold. Usually this results in a complete loss of the foothold, and the ant falls into the abyss."

There are various associates which the pitchers harbour, and it is interesting to note that these constitute a "terrestrial fauna" above the level of the fluid, and an "aquatic fauna" in the fluid.

The eel-traps of *Genlisea* are remarkable for their structural complexities, and there is a good deal of speculation regarding the function of the glands here. They may secrete mucilage to facilitate passage of the prey down the trap, or they may secrete digestive enzymes, or both. Bacterial action may not, however, be completely excluded in digestion. In both *Dionæa* and *Aldrovanda* which display the steel-trap mechanism the mode of capture of the prey is essentially similar and digestion is due to the secretions by the glands found on the inner surfaces of the traps.

In the chapter on *Drosera*, the phenomenon of aggregation in stimulated tentacles is fully