

REVIEWS

Radio Receivers and Transmitters. By S. W. Amos and F. W. Kellaway. (Chapman and Hall, Ltd., 11, Henrietta St., London), 1944. Pp. x + 281 with 150 figures and 8 plates. Price 21 sh. net.

There is certainly a real need for a competent book dealing specifically with the various aspects of the design, construction and operation of modern radio receivers and transmitters used for the different types of radio communication. But the volume under review is not, as its title would lead one to expect, such a book. In any case, this subject has developed so greatly that it would be impossible to deal with it satisfactorily within 300 pages, the size of the present book, which is essentially a text-book on the general principles of radio engineering. The title of the book is, therefore, not quite appropriate to its contents. As the authors say, it is not meant for the beginner, but for the somewhat more advanced student.

The ground covered here is not greatly different from that of the usual text-books. Starting with an introduction to the basic ideas and expressions, such as the nature of radio waves, amplitude and frequency modulation, etc., the authors go on to a discussion of the elementary electric circuits and their properties. In Chapter V, five pages out of the eighteen are devoted to radio wave propagation and the rest to receiving and transmitting aërials, mostly for short-wave working. Vacuum tubes and their uses, audio and radio frequency amplifiers and their classification into A, B and C types are dealt with in chapters VI, VII and VIII. Chapters VIII and IX cover receivers for amplitude and frequency modulation. The last chapter is devoted to transmitters for telegraphy, amplitude and frequency modulation broadcasting and television. The appendices at the end of the book deal with some of the familiar expressions relating to radio circuits.

The arrangement of the various topics and their treatment leave something to be desired. The discussion on vacuum tube theory is rather superficial and spread about. Microphones get about a page and that in the chapter on transmitters in between class B radio amplifiers and transmission lines. Quartz crystals cover about 2 pages. The explanations are in many cases not accurate. A few examples taken at random are the sections dealing with vacuum tubes, wave propagation (Chap. V), quartz crystals (Chap. X), and transmission lines (Chap. X). The discussion on transmitters in the last chapter is sketchy.

A careful revision and rearrangement of the book will enhance the value of a second edition. It may perhaps be better to avoid such expressions as "up in the air" (p. 201). Also "grid base" on page 185 should be "grid bias".

A feature of the book which is worthy of attention is the mathematical discussion of circuits and circuit behaviour. This is in-

variably good and helps a clear understanding of the problem under discussion. The authors are to be congratulated on this.

The printing and get-up of the book as also the figures and photographs are of the usual high standard for which the publishers are well known. The price is rather on the high side, but this is perhaps due to the prevailing war conditions.

K. SREENIVASAN.

Radio Technique. By A. G. Mills. (Chapman and Hall, 11, Henrietta Street, London, W.C. 2), 1944. Pp. vii+170 with 301 figures. Price 12s. 6d. net.

This is one of the best books on radio engineering designed for the beginner and the author must be congratulated on it. It is brief, nonmathematical, terse and accurately written. The average length of a chapter is a little over 7 pages. The longest covers 22 pages and the shortest but 2 pages. In less than 170 pages, the author attempts to cover a very wide field, starting from the elements of the structure of matter, electricity and magnetism, through d.c. and a.c. machinery and measuring instruments, on to radio transmitters and receivers and even such a comparatively new subject as pulse generators, which have been developed and applied so extensively during this war. That his attempt has achieved this measure of success is because the author chooses his subjects carefully, sticks to a treatment of the essential principles, and is terse in his explanations without sacrificing accuracy and clarity. He knows his subject and can present it well. The reader has necessarily to go to other books for a more detailed and mathematical treatment. But to the beginner, the book can be recommended without reserve.

A chapter on frequency modulation and another on ultra-high frequency and micro-wave technique would have added to the value of the book. Perhaps this will be made good in the second edition. The book is free from errors, but the half waves in the damped wave train in Fig. 50 (p. 35) should be spaced equally; the frequency of damped oscillations does not change from cycle to cycle or over a cycle. The title of Chapter XIII may perhaps be changed to read "The valve as an oscillation generator".

Praise is due to Messrs. Chapman and Hall for the excellent production of the book. It adds to their reputation as publishers of technical literature.

K. SREENIVASAN.

Hydro-Electric Power in India—A Geographical Analysis. By George Kuriyan. (The Indian Geography Society, Madras), 1945. Pp. 72. Price Rs. 2.

The booklet is the first of a series of Monographs published by the Indian Geographical Society, Madras, and compiles in a very interesting manner a good deal of information regarding water-power resources scattered in various reports published by the Provincial

Governments and by experts like Mr. Meares, Sir William Stampe, Sir Henry Howard and others.

The greatest need of the moment in India is the development of industries and power development is the *sine qua non* for industrialisation. The authors of the Bombay Plan have, therefore, rightly placed the production of power first in the list of basic industries. Unfortunately, as compared with other countries, India is severely handicapped with regard to natural supplies of coal and oil. Besides, as coal is absolutely essential for some of the basic industries such as iron and steel, cement, etc., it is imperative that every effort should be made to conserve our extremely meagre reserves, rather than utilize the same for the production of power. So that in India all developments of power will have to be mainly hydro-electric.

Fortunately, the potential water-power resources of India are indeed very great. On the basis of the Meares Triennial Report of 1922, our resources, even on the most conservative estimates, are about 12 million KW. But the developed resources so far constitute only 6 to 7 per cent. of the potential. The Bombay Plan suggests that the potential reserves are even as high as 27 million KW. Thus there is great scope for development.

The author, after first referring to the most salient geographical and economic features of some of the major hydro-electric schemes now in existence such as the Cauvery and Jog power schemes in Mysore, the three Tata schemes in Bombay, Pykara, Mettur and Papanasam in Madras, Pallivasal in Travancore, Mandi scheme in Punjab, the Ganges Canal Grid in the U.P. and Malakhand in the N.W.F., discusses very briefly some of the important potential reserves which lend themselves to immediate development. The following are some of the important schemes suggested as feasible for immediate development: KOYNA and KOLHAPUR projects in Bombay; MOYYAR and PERIYAR projects in Madras; TUNGABHADRA, GODAVARI and KRISHNA projects (irrigation and hydro-electric) in Madras conjointly with Hyderabad; MACHAND project in Madras conjointly with Orissa; JUMNA and SUTLEJ valley schemes in the North; DAMODAR valley, HUKONG valley and TISTA projects in the North-East. These alone would amount to about 3 million KW even on a very conservative estimate, and further expansion could be easily made as the demand for power increases.

The Indian Geographical Society, Madras, and the author, its Hon. Secretary, are to be congratulated in bringing out this useful and informative pamphlet at a time when India is about to enter upon a period of planned development. IL. N. RAMACHANDRA RAO.

Colorimetric Determination of Traces of Metals. By E. B. Sandell. (Interscience Publishers, Inc., New York), 1944. Pp. 16 plus 487. Price \$7.00.

The functional role of traces of metal is one of profound significance in several fields of

pure and applied sciences. In the domain of biochemistry traces of iron, copper, manganese, magnesium, zinc and other metals influence the course of physiological reactions; some of them in fact constitute the prosthetic group of certain enzymes essential to their activity. In metallurgy, traces of metals like vanadium, molybdenum and tungsten influence the structure, mechanical strength and corrosion resistance of metals, especially those of steel. The influence of traces of metals on the growth and disease of resistance of plants is well known. These effects are controlled by the concentration of these trace constituents. A colorimetric determination of these important metals in traces when they occur in association with overwhelming quantities of other interfering materials is the problem which the author has lucidly set forth in the volume under review.

The book is divided into two parts: (1) The General Part comprises the principles and the scope of trace analysis, the methods of separation and isolation of the trace elements and the application of colorimetry and spectrophotometry including fluorimetry to the detection and estimation of the trace elements. This part also includes a discussion of the principal organic and inorganic reagents employed in this analytical field. The stability and the range of sensitivity of these reagents are given.

(2) The second part deals with the analysis of individual elements; the presentation follows a certain pattern. To quote the author, "First the separation of the metal in question from other elements is considered, chief attention being given so far as possible to those likely to interfere in the colorimetric determination and to those frequently associated with the metal in question. For many metals, methods worked out specifically for the separation of traces are lacking and a brief general outline of separations is all that can be given, with the hope that some of these separations can be extended with suitable modifications to work involving small quantities. Next the important methods of determination are described. The procedures are given in general form so far as possible, independent of the nature of the original sample. The effect of foreign elements, so far as known, is mentioned. Finally, for many of the more important trace elements, directions are given for the determination of the metal in important classes of material". The volume is complete with examples of standard curves indicating the sensitivity and reproducibility of the method. The metals are arranged in the alphabetical order; this facilitates ready reference. An author and subject index completes the volume. The get-up is excellent in spite of war-time restrictions. This is an indispensable volume for not only to analytical chemists, metallurgists and biochemists, but also to the specialist interested in the elucidation of the catalytic role played by trace elements in plant and animal physiology. It is earnestly to be hoped that the author will in due course present to the scientific world an equally useful companion volume pertaining to the colorimetric analysis of non-metals.

Twenty Questions about Russia. By H. W. Henderson. (Hamara Hindustan Publications, Bombay), 1945. Pp. 56. Price As. 8.

Freedom of speech, of the press, of assembly, of street processions and demonstrations, in fact freedom in any form does not exist in the Soviet Union. Communists recognise the right to lie and cheat for the purpose of advancing their cause, the standard of living of the Russian worker was better under the Tsarist system than at present under the Soviet, inequalities exist as under the capitalistic system, Russian industry is run by a well paid bureaucracy and the workers have less control over industry in Russia than in any other country in the world, in fact in the Soviet Union the regime is patently a dictatorship OVER the proletariat, and not OF the proletariat.

These are some of the answers of Mr. Henderson—the author of *Twenty Questions about Russia*. As the Webbs have so aptly said in their well-known book on Russia, few other subjects in the history of human civilization have invited such bitter antagonists or ardent admirers as the “New Civilization” which the Communist Party in Russia have been trying to develop in that vast country since the revolution in 1917. To assess the true value of this great experiment and its phenomenal development in the Soviet Union, one need neither go to bitter critics, to which class Mr. Henderson evidently belongs, nor to ardent admirers and blind enthusiasts. The monumental work of Sydney and Beatrice Webb, *Soviet Communism—A New Civilization*, which is at once accepted as an authoritative and scientific exposition of the working and achievements of the Soviet new institutions would serve much to furnish a comprehensive and dispassionate view of the Russian achievements. But passages from old articles and questionable sources picked at random without any reference to the subject as a whole, as evidently the pamphlet of the type under review can at best be, is injurious to the judgment of people who have either no inclination or no opportunity to go deep into the subject. Reactionary pamphlets of this type and organizations who publish them, ill-serve the people—the villagers of India—whom they ostensibly wish to ‘enlighten’.

M. S. MUTHANA.

THE RIDDLE OF LIFE*

IN this little book based on a course of lectures given at Dublin, the author, Nobel Prize winner for Physics, and famous for his

* *What is Life?* by Erwin Schrodinger, pp. viii + 91, 6 sh. net, Cambridge University Press.

contributions to atomic dynamics, has ventured into the field of biology with the hope of throwing some light on the greatest of all problems confronting science—the ultimate nature of life. In these days of excessive specialisation, it requires no little courage for a physicist to venture outside his own field and put forward his ideas on other subjects. Professor Schrödinger is, however, not a specialist of the conventional type. Besides being a mathematician and a physicist, he is also a philosopher, with an original and distinctive outlook on the fundamental problems of science. Anything he says or writes can naturally, therefore, claim the attention and interest of all thoughtful persons.

During the present century, great advances have been made towards an understanding of atomic and molecular structure, and towards an elucidation of the manner in which atoms and molecules join up to form the aggregations familiar to us as various forms of matter. Our ideas regarding the building up of atoms and molecules from the elementary particles of Nature are based on the principles known comprehensively as the “quantum theory”. It is the quantum theory which enables us to understand why atoms and molecules have a stable structure, and why, again, a crystal when formed possess an inherent stability and a definite temperature of melting or transformation.

Professor Schrödinger’s main idea set out in these lectures appears to be that the quantum theory may also furnish us with the key to the riddle of life. One of the most remarkable features of life at all its levels is its inherent stability, as shown by the permanence of the characters exhibited by a species when it reproduces itself from generation to generation. Modern biological research has established the intimate relationship between this inherent stability and the ultimate structure of the living cell, and especially of the parts of it known as the chromosomes. It has also established the fact that changes in these structures accompany a mutation of the species either occurring naturally or when artificially induced. These facts become intelligible if we regard the genes as distinct molecular species which can only be altered by “quantum jumps”.

Professor Schrödinger has also some interesting suggestions to offer regarding the relation between the fundamental principles of thermodynamics, and the processes by which life functions, including especially the consumption and assimilation of food.

The book is both an attractive and a stimulating production.

C. V. RAMAN.

THE ACADEMY OF SCIENCES, U.S.S.R.

The Academy of Sciences of the U.S.S.R. is holding the celebration of its 220th anniversary from the 15th to the 28th of June 1945. Invitations have been extended to the fore-

most scientists in all allied countries. Professor Meghnad Saha, F.R.S., according to Reuter, has safely arrived in Moscow to participate in the celebrations,