

play some part in the process. Dahlgren described what appeared to be a sphincter around the tracheole at this point, and beyond it a structure with radiating fibres. Buck outlines a reasoned hypothesis according to which the glowing of the organ is dependent on the diffusion of oxygen into the tracheoles, while the flashes are due to the mechanical projection of 'jets' of air into the tracheole by the controlled relaxation and contraction of the sphincter mechanism in the tracheal end-cell. But he concludes that the evidence at present available is insufficient to decide between this hypothesis and that of direct nervous stimulation of enzymic activity in the photogenic cells.

V. B. WIGGLESWORTH

SYMPOSIUM ON SEARCHLIGHTS

ONE of the most important features of a scientific society is its capacity to arrange a symposium on a special feature of its activities and to publish the resultant papers. There are many subjects where the interested people are too few for the probable financial return to tempt an author to the publication of a book, and where in addition the knowledge is so specialized that no one author can easily do justice to it. The publication under review* is such, and the Illuminating Engineering Society deserves the thanks of those who, either as user or manufacturer, need to know about searchlights in some detail. The scope of the book is indicated by the sectional headings: "The Function and Design of Army Searchlights", by E. W. Chivers and D. E. H. Jones; "High-power Searchlights of Wide Divergence", by Air Commodore W. Helmore, H. K. Cameron, F. S. Hawkins, L. B. W. Jolley and L. M. King-Brewster; "Photometry of Searchlights", by H. K. Cameron, E. H. Rayner, E. R. Thomas and G. T. Winch; "The Visibility of Targets in a Naval Searchlight Beam", by W. D. Chesterman and W. S. Stiles; "Some Visibility Problems Associated with Anti-Aircraft Searchlight Beams", by S. S. Beggs and J. M. Waldram; "Air-craft Searchlights for Anti-Submarine Warfare", by Commander C. J. Carr.

There are, in addition, some twelve pages of discussion.

The meeting was held in London on April 15, 1947, and presumably the difficulties of post-war publication are responsible for the delay in the appearance of the book.

As the titles suggest, there is a marked war-time flavour about the publication, although some of the work was carried out before 1940 but has not previously been made available to the scientific public. The balance between the historical background of searchlight design, theory and photometry, and the immediate foreground of practical war-time development has been well maintained, and the result is a record which will find a place in many industrial and technical libraries.

It may come as a surprise to many that an increase in intensity of a searchlight from 100 megacandles to 500 megacandles only increases the range by some 50 per cent in clear weather and by only some 15 per cent in medium weather. One may therefore be allowed to wonder whether the effort put into the development of the larger sizes of searchlight was

justified, especially as it meant the complication of additional spare parts.

Probably the part which will attract most attention is the description of the design and manufacture of high-powered projectors for such special purposes as the interception of night-flying aircraft and submarines lying on the surface of the sea. The 'Turbinlite'—to use the war-time code word—as finally designed consumed 140 kw. with a 90-cm. mirror and was supplied by batteries which could operate for four periods of 30 sec. The whole was carried in the nose of an aeroplane, and the success of the scheme was demonstrated on many occasions. Figures are also quoted for the 'Leigh Light'—used against submarines—showing that the number of U-boats seen was increased sevenfold by its use and that 11 per cent of all night attacks carried out by its use resulted in 'kills'. The specialist in photometry will find summaries of considerable value, of both theory and practice as applied to these mammoths of the illuminating engineer's industry, much of it available in convenient form for the first time. In the case of 'visibility', many of the problems only became urgent under the stress of enemy action. Some of the solutions are especially neat, such as the 'perspective' explanation by Beggs and Waldram of the case of the apparent sudden ending of a searchlight beam to an observer near the projector.

There are a number of errors and misprints which may cause difficulty, as, for example, p. 44, Fig. 17(b). The symbols θ and ψ appear to be interchanged. P. 45, third line, this expression has been disarranged in the printing. P. 133, in the formula the symbol ϕ has been omitted after K in the square brackets.

The book provides in a convenient form a technical treatise on its subject and, in addition, a record of war-time achievement of which the various authors have reason to be proud. The diagrams and pictures are clearly and well produced; but an index would have increased the reader's pleasure and the utility of the production.

W. M. HAMPTON

AFFORESTATION FOR BENGAL

ANYONE who has travelled by railway throughout India must have noticed the disparity reigning in the distribution of the forests in that country. In some parts the railways pass through great and apparently interminable tracts of forest and jungle. In others, of which Bengal forms one of the best of examples, the converse is the case. Between Calcutta and the foot of the Darjeeling Hills the traveller by railway passes over a great plain devoted mainly to the production of rice, the villages mostly in groves of palm trees, but a total absence of forest. The forest part in Bengal represents only 0.07 acre per head of population. Bengal has only 9 per cent of its surface under forest, and a considerable part of the latter is in the Darjeeling Hills and the Sundarbans south of Calcutta.

Modern conditions and demands resulting from the Second World War, to some extent, and the great necessity to improve the agricultural soils of the Province, have at length roused the authorities. These soils are not manured. The large quantities of cow dung obtained from the great herds of cattle kept by the villagers are at present, and have been for many centuries past, utilized as fuel for heating

* Searchlights. A series of five papers, with the discussion on those papers and a further written contribution. Pp. 164. (London Illuminating Engineering Society, 1948.) 17s. 6d. net.

and cooking purposes. One of the objects of the projected afforestation plan for Bengal is to create plantations suitably distributed to provide fuel for these purposes and thus release the manure for its proper use. A Bill for the purpose of afforesting of waste lands and for conserving what is left of private forests was introduced in the Bengal Assembly in 1944. The Bill was enacted in April 1945, and already considerable progress has been made so far as private forests are concerned.

Here we have somewhat similar provisions to the Dedication of Woodlands scheme in Britain (*Nature*, Sept. 4, p. 364). The Bengal Government has the power and the duty of telling the owner how to use his forests, and the Government will meet all expenditure for the first ten years, and in certain cases and conditions the Government may make loans to private owners. As regards the waste land, the estimated area which should be, and could be, afforested is four million acres or 9 per cent of the area of the Province. If this area was afforested Bengal would then have no less than 18 per cent of its lands under forests. Much of this area, it is said, is above the paddy fields and is of a highland nature. It is said to have been under forest once, but with the forest removed soil deterioration, leaching and erosion resulted. Yet the land is believed to be afforestable. It is a big scheme and one which will make high demands on the forest staff of the Province in all its ranks.

In the paper read by Mr. T. M. Coffey, chief conservator of forests, before the members of the Rotary Club, Calcutta, in 1947 (reprinted in *The Indian Forester*, 73, No. 11; November 1947), it is said that to carry out the programme will require to have a forest officer in every district in the Province. At present there are ten districts with forest officers and seventeen without. There can be little doubt that this is a thoroughly sound scheme—but it will require pluck, perseverance and drive and continuity in management and working to see its successful completion. If this is fully recognized, enormous benefits will be conferred upon future populations in the Province.

E. P. STEBBING

THE B.B.C. QUARTERLY

IN April 1946 the British Broadcasting Corporation inaugurated a new periodical entitled *The B.B.C. Quarterly*, which was intended for those in Great Britain and abroad who are interested, professionally or otherwise, in broadcasting and its organisation. During the past two years the successive issues of this journal have contained articles on a wide variety of subjects connected directly or otherwise with the purpose of broadcasting and its administration, and with the technical and radio engineering developments which are necessary for the ever-increasing needs of modern broadcasting, including its international aspects.

More than half the contents of the first number of the third volume, issued in April, comprises a series of articles by specialists introduced and edited by Sir Arthur Salter under the general title of "The Impact of Broadcasting on Great Britain's Life and Outlook—I". The remainder of the issue consists of three articles dealing with some present-time activities of the engineering sections of the B.B.C.

In the first article, Messrs. H. B. Rantzen and J. H. Holmes describe the proposed developments which are now being undertaken to provide adequate communication facilities, mainly telephone and teleprinter, over the whole network interconnecting London and the regional broadcasting centres in Great Britain. Following this, Mr. L. Hotine gives an interesting, illustrated account of the engineering arrangements which were made for broadcasting the Royal Wedding. On this occasion, commentaries and eye-witness accounts of the processions and marriage ceremony were made in forty-two languages for the B.B.C. Home, European and Overseas Services. Provision was also made for such accounts to be given to more than fifty stations and networks in the Dominions and Colonies, and for similar facilities to be provided for the big networks and independent stations in the United States and in various European countries. Certain limited television programmes were also provided; and the success of all these arrangements is a tribute to the efficiency of all those concerned with this phase of the operation of outside broadcasting technique.

The third article deals with a subject of great and increasing importance in modern broadcasting: the suppression of unwanted radiation from medium-wave transmitters. Mr. J. B. Webb describes the manner in which spurious radiations from transmitters can, by harmonics or combination frequencies, cause interference with other broadcasting services. This possibility has become more serious in recent years, due to the increase in both the number and power of stations in operation in the medium wave band. The identification and attenuation of existing spurious radiations is often expensive and complicated, requiring the use of widespread technical facilities. But it is very clear that careful consideration should be given to possible unwanted radiations before a new service is introduced, or an increase in power contemplated at an existing installation.

FORTHCOMING EVENTS

Saturday, September 11

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, DIVISION FOR SOCIAL AND INTERNATIONAL RELATIONS OF SCIENCE (at the Dome, Brighton), at 7.30 p.m.—Discussion on "Science Across the Frontiers". (Dr. Julian Huxley, F.R.S.: Introduction; Dr. Joseph Needham, F.R.S.: "Origins and Development of the Organisation of International Scientific Co-operation"; Prof. Pierre Auger: "Present Scientific Activities and Programme of UNESCO"; Dr. Paulo Carneiro: "The International Research Institute of the Hylean Amazon").

Sunday, September 12

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (at the Dome, Brighton), at 8 p.m.—Rt. Hon. Viscount Samuel, P.C.: "Science and Philosophy".

Monday, September 13

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (at the Royal Pavilion, Brighton), at 8 p.m.—Prof. J. D. Bernal, F.R.S.: "Waves and Beaches".

Monday, September 13—Tuesday, September 14

SOCIETY FOR GENERAL MICROBIOLOGY (at the University, St. Andrews).—Scientific Papers.

Monday, September 13—Friday, September 17

HORTICULTURAL EDUCATION ASSOCIATION (at Edinburgh).—Autumn Conference.

Wednesday, September 15

ROYAL INSTITUTE OF CHEMISTRY (at Manson House, 26 Portland Place, London, W.1), at 7.30 p.m.—Dr. A. J. Turner: "Research on Linen".