

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.