

existing facilities to meet the needs of temporarily or permanently disabled patients.

Local authorities were given wide powers to promote the welfare of the disabled by the National Assistance Act of 1948, but comparatively few have taken advantage of these powers. The use of "work aids" is discussed and the cooperation and ingenuity of industry in providing these is commended.

The Committee supports the quota scheme for the employment of disabled and refutes the suggestion that their apparent segregation is undesirable. This is contrary to the opinion of Hanman and others in the United States. Assessment of capacity is stated to be a medical responsibility and it is presumed that this refers to physical capacity and the part which the doctor plays in placement in industry. Attention is directed to the role of the Disablement Resettlement Officer and the need for careful selection and suitable training for this important post is stressed.

The difficulty of obtaining remunerative employment for the severely disabled is recognized, and the recommendation that transport should be provided for these workers is practical.

The Committee do not consider that much in the way of additional capital expenditure is required. Apart from the experimental centres to which reference has been made, it is urged that all major hospitals should establish resettlement clinics, that hostels for the disabled should be provided, and that there should be an expansion of the welfare services of local authorities.

The report is certainly comprehensive though its length may defeat the object of ensuring greater knowledge of the wide range of services. While all may not agree with certain recommendations, the Committee are to be congratulated on the production of a report which must have entailed much work and which clearly demonstrates that this country leads the world in this important branch of social service.

A. AUSTIN EAGGER

**The Treatment of Fractures**, Vol. 11. By Lorenz Bohler. (Pp. viii+438; 941 figures. \$17.50.) London and New York: Grune & Stratton. 1957.

The second volume of this well-known work deals with injuries around the hip and fractures of the femur. The subject matter is very fully discussed in the 430 pages and is illustrated by a wealth of radiographs, photographs, and diagrams. Every aspect of these injuries has been covered. The author has obviously intended that the book should be used for reference by all members of a fracture unit; for instance, we find detailed lists of material and instruments required for the application of a hip spica; facts which are more necessary to the plaster sister than for the orthopaedic surgeon. Also, the questions which follow each section of the book are much more reminiscent of a cram book for the medical student than a specialist textbook. The practising fracture surgeon would be inclined to consider Prof. Bohler rather too verbose on some of the more archaic methods of treatment; 17 pages devoted to the treatment of fractures of the neck of the femur in a

Whitman plaster may be of historical value, but are hardly of any practical use. There are several similar examples which obscure the really valuable information.

Despite these criticisms the book remains a valuable study of femoral injuries and will continue to hold its place as one of the foremost works of reference.

J. N. WILSON

**I Fondamenti Igienico-Fisiologici della Illuminazione Razionale.** [Le relazioni tra illuminazione e visione.] (Physiological bases of rational lighting as a hygienic measure.) By Antonio Tizzano. Roma: Edizioni E.N.P.I. 1956. (Pp. x+75; 53 figures. L.1,200.-) 1956.

The present era of high-grade precision work in a wide variety of industries has brought a realization that light is one of the most essential factors in efficient and accurate work. On this level the proposition is soon apparent even to refractory minds, but it should be no less apparent to employers and managers in all industries. The standards laid down by law are minima and do not sufficiently impress the great effect of a pleasant and bright ambience on the contentment, liveliness, and effectiveness of workpeople. In the words of the well-known authority, Weston, the law sets "a limit to the dimness allowable". All too frequently the factory or workshop presents far too dim and gloomy an atmosphere, a situation which is, in most cases, readily remedied often at little expense. Expenditure or not, however, the provision of adequate general lighting combined with local lighting, which permits good visibility without strain at the working point is a requirement to which every workman has a right. The problem varies in different industries and calls, in the more difficult instances, for specially expert advisers since no universal standard can be laid down. But there are general physiological principles which relate visibility to illumination which should be understood by all medical personnel in industry.

Dr. Tizzano has, in the present little volume, given a quick but valuable review of present knowledge on this matter. There were and still are many difficulties. The scrambling growth of industry soon blocked out even the proper use of the best of all sources of light by design and congestion of buildings, hopeless ill-supply of window space, and accumulated opacity of even such windows as there were. In modern times sustainable excuse remains neither for industrial gloom, nor for lack of information, especially in the minds of medical men and women in industry, on the various lighting codes which have been worked out.

Tizzano, himself a contributor to modern techniques of industrial illumination has, in this work, given the principles, based on results obtained mainly in the last 20 or 30 years, especially in Britain and America, which must be understood in order to build up a rational lighting system for any industrial operation. Starting from the prime factor of visual acuity (power to distinguish test objects of known size at known distances or, quantitatively, the reciprocal of the angle subtended at the eye by the smallest test object distinguished) and those influencing it (contrast, seeing time, luminance of the background), the author proceeds to the most important

adjuvant factors of age, direct glare (ratio of the luminance of the immediate background to that of the surround or, qualitatively, the irritating direct intrusion of surround luminances into the field of vision), indirect reflected glare (reduction of visibility at the working point by intrusion of luminances from reflecting surfaces, e.g., from the work object itself or from the immediate background; determination of zones of potential indirect glare is largely a matter of geometry), choice of diffuse or direct lighting (play of shadows can produce an apparent change in visibility of solid objects), background structure or design which can diminish the visibility of objects and, finally, the colour of object or background.

The review of these aspects of seeing is given with a strongly physiological and erudite flavour, richly illustrated with graphs and diagrams taken from or adapted from the original papers. It calls for slow study with careful digestion of the meaning of each point made; the graphical method will, if this is done, be found to imprint principles in this form more readily than words.

The older view that above a certain luminance no further increase of acuity is obtainable has been known for a good many years to be in error for, given a constant contrast and sufficient visual time, two-point discrimination increases asymptotically with increase of luminance, the limiting visual angle being about 0.406 ft. at about 1,400 foot-lambert. As stated by Moon and Spencer (1944), the higher the luminance the better the vision. This proposition completes the process of correction of the findings of König in 1897 which was started by Lythgoe about 1932 and which gives the final justification of the almost obvious fact that the best illumination for visual work is daylight (up to 1,000 foot-lambert at its best).

For practical purposes the advantage gained from increases at very high luminance is very small as is readily

seen from the empirical equation  $\alpha = \alpha_{\infty} \left( 1 + \frac{K}{B^n} \right)^n$

when  $K$  and  $n$  are constants and  $\alpha_{\infty}$  is the limiting value of  $\alpha$  as  $B$ , the luminance, approaches infinity. Nevertheless, the great effect of increased luminance in augmenting visual acuity in wearers of spectacles and in older workers (presbyopia and diminished size and variability of pupil) must not be overlooked.

One aspect to which we would direct the attention of medical officers is that of the time taken to recognize an object, the reciprocal of which may be called velocity of vision. The workman being quite likely, in an ordinary non-quantitative test, to give an affirmative answer without regard to the time taken to recognize the test object (i.e., to the subjective effort he will experience), it should fall to the medical examiner to make objective measurements of it in the conditions of size of object, luminance and contrast obtaining.

It is a pleasure to observe that full justice is done in this review to the outstanding work of Lythgoe and of Weston, one of the well-known nomograms constructed

by the latter being given in modified form for determining the intensity of illumination required for different percentages of maximum visibility defined by size of object, distance from the eye, visual angle, and contrast between object and background.

For those who wish to enter the more erudite fields of industrial medicine this review could serve as an introduction to one aspect of it and could stimulate the younger recruit with a research bent to adopt it. [1 foot-lambert = the objective measurable brightness of a perfect diffusing surface emitting 1 lumen per square foot. 1,000 foot-lambert = 2-1/3 candles per square inch.]

M. W. GOLDBLATT

### Books Received

(Review in a later issue is not precluded by notice here of books recently received.)

**Recent Outbreaks of Infectious Diseases.** By S. Leff. (Pp. ix + 408. 35s.) London: H. K. Lewis. 1957.

**The Index of Technical Articles, No. 2, March, 1957.** (Pp. 90. Subscription £6 6s. per annum.) London: Iota Services.

**Report on the Health of the Royal Air Force and the Women's Royal Air Force for the Year 1953.** [Air Ministry—A.P. 3319/53.] (Pp. 91.) London: H.M. Stationery Office. 1957.

**International Comparison of Unemployment Rates** (reprinted from *The Measurement and Behaviour of Unemployment*, Reprint No. 86. A Report of the National Bureau of Economic Research). By Walter Galenson and Arnold Zellner. (Pp. 439-583.) Berkeley (California): Institute of Industrial Relations. 1957.

**Central Mining—Rand Mines Group. Health Department Report for the Year 1956.** (Pp. 24.) Johannesburg: Rand Mines Ltd. 1957.

**Tata Industrial Health Refresher Course, 1956.** (Pp. 19; illustrated.) Tata Industries Ltd. 1957.

**Particulate Clouds: Dust, Smokes and Mists.** By H. L. Green and W. R. Lane; Foreword by Sir Harold Hartley. (Pp. xix + 425; 8 plates and text figures. 70s.) London: E. & F. N. Spon. 1957.

**Precancerogenesi e tumori professionali, Vol. II.** By G. A. Chiurco. (Pp. xvi + 1268; illustrated. Lira 10,500.-) Rome: Istituto Nazionale per l'Assicurazione contro gli Infortuni sul Lavoro. 1956.

**Ergonomics: Human Factors in Work, Machine Control and Equipment Design, Volume I, No. 1, November, 1957.** Edited by A. T. Welford. (Pp. 100; illustrated. 25s. per part; Sub.: £4 15s. per volume.) London: Taylor & Francis. 1957.

**Chronic Bronchitis, Emphysema, and Cor Pulmonale.** By C. H. Stuart-Harris and T. Hanley. (Pp. 252; 61 figures, some in colour. 42s.) Bristol: John Wright. 1957.



## I Fondamenti Igienico-Fisiologici della Illuminazione Razionale

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