Eyes and Industry. (2nd ed. of *Industrial Ophthalmology.*) Hedwig S. Kuhn. St. Louis, Mo.: Mosby, 1950. 378 pp. $8.50.

Eyes in Industry: A Comprehensive Book on Eyesight Written for Industrial Workers. Dorothy Adams Campbell, W. J. B. Riddell, and Sir Arthur Salusbury MacNalty. London–New York: Longmans, Green, 1951. 234 pp. $6.50.

Extensive use of mechanical power has lessened dramatically the demand on man's strength, and the skill of the workman is more and more being transferred to the machine. Sir Edward Appleton, Secretary of the (British) Department of Industrial Research, appropriately remarked, "It has been the custom for us to regard industrial workers as 'hands,' and we are accustomed to such phrases as 'hands wanted.' Nowadays, it would be more appropriate to say 'eyes wanted,' for workers are becoming more and more employed and paid for services whose main demand is on eyesight." This fact is reflected in the growing interest of several groups of specialists and of enlightened management in the most effective utilization and conservation of one of our precious resources—the human eyesight.

During each of the past three years there has been published an important contribution to the field of industrial ophthalmology. In 1949 it was H. C. Weston's *Sight, Light and Efficiency* (SCIENCE, **111**, 432 [1950]). The following year Kuhn's *Industrial Ophthalmology* (1944) appeared in its second edition, enlarged by almost 100 pages and rechristened. In 1951 a group of British workers put out a book bearing an almost identical title. Whereas Weston is concerned principally with illumination and the experimental study of visual components of industrial performance, Kuhn approaches the problem of eyes in industry from the point of view of industrial ophthalmology as a specialty within the broader frame of industrial medicine. The British authors wrote for a nontechnical audience but covered all four major problems: provision of adequate illumination, environmental (such as brightness contrast) and optical aids to vision, suitability of particular eyes for particular jobs, and avoidance of industrial hazards to the eyes.

A. C. Snell, in his foreword to Kuhn's treatise, makes it clear that the demands made by modern industry on man's vision (and on the industrial ophthalmologist's skill and knowledge) are manifold. It is not just a matter of ocular traumatic surgery and prescription of lenses to correct defects of refraction. The visual abilities required by different jobs vary markedly. Sometimes it is a sharp visual acuity at a far or near distance, at other times an accurate color discrimination or a quick and reliable depth perception. These specific demands must be taken into account in visual testing in industry. Dr. Kuhn's close contact with the realities of the shop and the factory, documented by numerous pictures of industrial operations, and her association with the Department of Industrial Psychology at Purdue University, carrying on extensive investigations on vision in industry, are positively reflected in the 100-odd pages devoted to the problem of visual tests and standards and the 30 pages dealing with corrective programs. This section constitutes an outstanding feature of the book. The second large portion of Kuhn's volume is concerned with eye injuries caused by solid bodies (a chapter contributed by A. C. Snell), radiation and chemical agents, and with eye protection. Short chapters cover illumination (distribution of light, brightness contrast, color factors, intensity of illumination), and the blind in industry. A large number of references concerning the relationship between lighting and production are given, but the literature is not critically analyzed and synthesized. Only a few lines are devoted to the problem in the text.

The British collaborative publication is directed to management rather than to specialists in industrial ophthalmology, physiology, and psychology, and its nature is indicated by its subtitle "A Comprehensive Book on Eyesight Written for Industrial Workers." Its object is a practical one—better eyesight and better care of human eyes in industry. It covers much the same material as Kuhn's volume but provides more data on the anatomy and physiology of the eye. There are brief chapters on eyesight of adolescents, which stress the importance of visual abilities for vocational guidance; on eye defects common to adults; and on the "psychology of sight," devoted largely to the phenomena of illusion and hallucination, a matter which has little or no relevance to industrial vision. Two long chapters deal with eye injuries and their prevention, and with eye diseases in industry. These chapters overlap to a considerable degree, which is not uncommon in collaborative works but which indicates inadequate planning and insufficient editorial attention. Thus first aid is discussed in special subsections on pages 126–28 (chap. X), pages 167–69 (chap. XII), and again in Appendix I (pp. 195–99). If a second edition is to be issued, the unnecessary duplication should be eliminated. Appendix II contains a detailed schedule of values of illumination recommended in 1946 for the lighting of building interiors by the (British) Illuminating Engineering Society. Appendix III provides a useful summary of visual standards in the armed forces as well as for various occupations (e.g., police and railway employees).

JOSEF BROŽEK

Laboratory of Physiological Hygiene
University of Minnesota, Minneapolis