describing the nature of the disease in so far as this is now understood, its diagnosis and pathology. The currently recommended practice relating to the selection and supervision of workers is briefly considered also.

This book, to which 12 authors have contributed, is the first written in the English language to give a full account of all aspects of industrial hygiene relating to beryllium, and will certainly be appreciated by many readers. References to published work are listed at the end of each chapter and number nearly nine hundred in all.

T. G. FAULKNER HUDSON

Health in the Rubber Industry—a Pilot Study. Rubber Manufacturing Employers' Association. By H. G. Parkes. (Pp. 203; 42s.) Manchester: Megson. 1966.

This well produced book gives the results of the pilot study during 1958 and 1959 of sickness absence in the rubber industry carried out by the Rubber Manufacturing Employers' Association Health Unit. Fifty-two of the 120 firms in the Association collaborated in the study. The Unit was notified of the spells of sickness absence lasting more than three days occurring among 59,000 men and women, 70% of those employed in the industry.

Absences were notified after the termination of the spells. The method of ensuring that each spell was recorded (especially among those who retired or resigned during sickness absence) is not stated; nor is it clear whether long absences were curtailed after a pre-determined duration in order to counteract the effect of different retirement policies in different firms and occupations.

The combined results from all the firms are presented as case rates per 1,000 persons and (calendar) days per 1,000 persons per annum for men, single and married women in 11 five-year age groups, 15 occupation groups ranging from storemen to commercial staff, and 17 diagnostic groups (some subdivided). About 8% of the spells are classified as 'ill-defined' and not referred to the appropriate disease groups, probably because symptoms are included in this group. The diagnoses coded were those from *final* medical certificates.

There are some very interesting tables and graphs of internal comparisons by age, sex, marital status, and occupations. Good use is made of the techniques of age standardization and the comparison of the actual rates of sickness in occupational groups with the rates 'expected' in these groups if they had had the age distribution of the entire male population of all the occupation groups. Men employed in latex mixing, dipping, and extruding have higher rates of sickness absence than other groups, especially from bronchitis, diseases of the stomach and duodenum, and skin diseases. Commercial staff have particularly favourable rates. It is recognized that some of the variations between occupational groups could be due to differing sick pay arrangements. There must also be concealed some interesting effects due to location of employment.

The external comparisons with London Transport data are less useful because, as is pointed out, the latter

refer to 1949/52. In addition, the London Transport data refer to spells commencing and are curtailed at 182 days' duration; there are also important differences in the diagnostic grouping. Some of the data (especially for women) in both studies are so sparse that comparisons must be treated with caution.

This is a valuable addition to the small number of studies of sickness in specific industries.

P. A. B. RAFFLE

Artificial Lighting in Factory and Office. CIS Information Sheet 11, Smp. September, 1965. (Pp. 61; 58 figs; \$2.) Geneva, Switzerland: International Occupational Safety and Health Information Centre (CIS), International Labour Office.

Lighting in the factory and office is discussed under the headings of required intensity, choice of lamps and fittings, installation planning, colour treatment, and maintenance. Further sections deal with special techniques, glare control, and the diagnosis and remedy of complaints. Australian standards of illumination are quoted for six tasks and a comparison is made of filament, fluorescent and mercury vapour lamps. Fittings are considered in respect of glare control and ceiling reflection. The shading of filament and fluorescent units is described in detail. Three main types of installation, uniform general, general plus supplementary local, and localized lighting are described with reference to height, spacing, light direction, and the elimination of reflection. Recommended reflection factors for coloured ceilings, walls, furniture, and floors are quoted. A method of estimating the depreciation of ageing fluorescent lamps is described. Special techniques for examining shiny surfaces, irregularity detection, UV fluorescence, magnification, and luminous background devices are briefly dealt with. Glare elimination is discussed in detail referring to shielding angle (recommended values quoted) and diffusing fittings. The final section deals briefly with common faults leading to discomfort and fatigue.

M. K. MOLYNEUX

Operational Research and the Social Sciences.

Ed. by J. R. Lawrence. (Pp. 669; 115s. 6d.) London: Tavistock Publications. 1966.

This bulky, difficult, and important book is one of the outcomes of an international conference held in Cambridge in 1958. The conference was organized by the Operational Research Society to bring O.R. scientists and social scientists together to explore common ground and discuss how they might work more closely together.

The idea of O.R. is not difficult to grasp; though for some, like the present reviewer, there comes a point where the mathematics inhibits a really intimate acquaintance. Experience has amply confirmed the belief on which O.R. was founded—that the scientific method is useful for the solution of the practical problems of complex organizations. Dr. Lawrence, in his preface, assumes that social scientists are also 'concerned with using their abilities to effect improve-

ment in organized human activity'. However, despite the supposed common interest, the fact is that O.R. men and social scientists have in the past diverged in the way they have formulated their problems and analysed them; and the early hope that most O.R. teams would be multi-disciplinary has not been fulfilled. The conference was in one aspect an attempt to effect a new convergence, or at least to establish the reasons for divergence.

Few of the 35 papers presented actually tackle directly the issue of where common ground lies. This is left largely to the sponsors of the five sections of the conference, who introduce and comment on the papers in their sections. It is impossible to summarize and comment on all the papers, and also pointless because the book itself contains an excellent synopsis. The quality of the papers, although varied, is on the whole very high indeed. This review will refer mainly to those papers which referred in one way or another directly to the relationship between O.R. and the Social Sciences.

Dr. A. T. Welford's paper hasn't a mathematical symbol or an obtrusive statistic in it. In examining the analogy between a man working with a machine and a man working with another man, Welford shows that a bridge can be built across the gap between experimental psychology (which is concerned with the former) and social psychology (which is concerned with the latter). There is no direct mention here of practical problems or of O.R. But likewise many of the papers presented by O.R. practitioners for this conference could have been written had social science never existed.

But some contributors did set out to be bridge-builders. Professor Rapaport of the University of Michigan, in his paper on Conceptualization of a System as a Mathematical Model, discusses the possibility of shifting from mechanical and organic models of systems to mathematical ones. He is concerned to abstract completely from the content of natural systems to their common form by the use of mathematical homologues. Although Rapaport's models are not the kind O.R. scientists use, the paper represents a suggestion that the language of mathematics might with profit be used to indicate the analogies between social systems and other systems and in doing so increase understanding of social systems. In the discussion following the sectional papers on 'Systems Theory', in which Rapaport's paper appears, there is some adverse criticism both from O.R. scientists and social scientists, mainly stressing the dangers of divorcing form from content too rigorously. One contributor pointed out that the difficulty in using mathematics to build abstract social-system models is that until social science has some agreed definitions of its concepts no one will be clear what the symbols stand for and matters will be more confused than ever.

Professor Ackoff, of the University of Pennsylvania, one of the most eminent O.R. scientists in the United States, attempts some bridge-building, at a different level, in his paper Structural Conflict within Organization. He constructs a mathematical model of structural conflict, points out that this general formulation might lead to prescriptions for ending destructive conflict, adds that since many O.R. problems are sub-unit

problems, O.R. solutions could possibly compound structural problems, and suggests that the behavioural scientists might help the O.R. men by directing their attention to organizational structure, and developing a capacity for diagnosing structural conflicts.

The conference notwithstanding, there is still much confusion in the 'twilight zone' between O.R. and social science. Such deliberate bridge-building as was attempted came mostly but not entirely from the O.R. men. Professor Cook in particular worked very hard at it. I should guess that most social scientists feel that social systems are too complex, too varied, and too idiosyncratic for their practical problems to be reducible to a few general mathematical forms. Neither are most social scientists numerate enough to be sure of themselves when they look in the direction of O.R. O.R. scientists, on the other hand, can see that the implementation of the solutions they propose might not take place at all (an interesting paper by Professor Ratoosh of the University of California claims that many good solutions are left unused) or might founder because of human cussedness or organizational ineptitude. They would genuinely like the help of the social scientists whom they believe to be capable of systematic thought about such things. However, the role of 'obstacle shifter' might not seem to the social scientists to be an attractive substitute for activities like building new (verbal) theories.

As a sociologist, I found this book difficult to review. Some of it I did not understand at all, some of it I found very difficult, and I was only really at home with the papers of the organizational sociologists; but to work through all the papers was well worth the effort. The O.R. Society is to be congratulated for having assembled such a distinguished and diverse array of talent, and the editors and sponsors deserve praise for giving the diverse presentations a structured setting which revealed clearly the points of shared and discrepant interest. When the day comes, as it surely will, when a new and recognized university discipline of organization study emerges, the Cambridge Conference and the present book will be regarded as important mileposts.

T. LUPTON

Rehabilitation of the Hand, 2nd Ed. By C. B. Wynn Parry. (Pp. x + 367 with Index; 92s. 6d.) London: Butterworth. 1966.

In the eight years since the first edition of this book was published progress has been such that in addition to extensive re-writing, several new sections have been included. These range from a description of changing concepts in the function of the intrinsic muscles to details of special physiotherapy techniques, remedial exercises and games, and some very practical illustrated instructions on the making of splints.

The author's description of a method for the retraining of sensory function in the hand affected by peripheral nerve injury is, as Pulvertaft points out in his foreword, of especial interest.

In the chapter on resettlement, a timely plea is made for a closer integration of the various agencies involved in this problem. Reference is made to the role of the Industrial Medical Officer as intermediary between hos-