This handbook, which supersedes parts of Handbook 78 (1959), presents recommendations agreed at the Meeting of the International Commission on Radiological Units held at Montreux in April 1962. It consists of four sections: 1. Direct and relative measurements of the activity of radioactive sources; 2. Low-level radioactivity in materials and its relation to radioactive measurements; 3. Availability of radioactive standards; 4. Techniques for measuring radioactivity in samples and living subjects.

Sections 1, 3, and 4 are extensions and revisions of the 1959 recommendations; section 2 appears for the first time and deals specially with the contamination of materials used in counting equipment, radiation shields, and in chemical reagents used in the preparation of samples for radioactive measurement.

The present recommendations are supplemented by over 250 entitled references.

G. E. HARRISON


Industrial absence is a pressing problem. When that due to known sickness is omitted, much still remains. Some think this reflects too high wages; some that it represents hidden ill-health; some that it implies failure of work incentives to complement full employment; some even that it portends social decay. There has been much research on 'certified absence'; little on other types. The problems are scarcely more formidable than with accidents, which have been extensively surveyed. This ennui is puzzling and unexplained.

This is a highly professional study based on over six years' enquiry by many experienced research workers. It is a distillation of previously published reports and is written mainly for the non-specialist. For stated reasons, all absences are pooled, and the indices used are thus heterogeneous for causation. The terms of reference are limited to compiling data on 'attendances' (at 26 collieries) over periods of up to one year, and to studying how they and working capacity are affected by work methods and conditions. Chapters are orthodox to a survey of this type. Unfortunately, even using a hierarchical approach, the separate effects of confounding factors could not always be identified, even with the very large population (38,000 men) studied. There is an extensive appendix, glossary, and selective bibliography.

The authors tackle the difficult problem of comparing rates based on skewed distributions of the events and disparate denominators by two methods: first, 'balanced samples' to equalize denominators within groups, and a transformation of the variate to normalize the variance. (This transformation, the square root, is well chosen and has the added advantage that the variance of √x is independent of the mean, if x is Poisson*); second, weighted means, which is less satisfactory. With both methods, differences between means are apparently taken to be real and not due to sampling errors, which is a dangerous assumption. Much emphasis is placed on 'trends'. Formal tests of significance, and standard errors of all estimates, are omitted. This is surprising, even though examination of some of the data has previously been published; presumably the 'general reader' was not to be deterred. This is this reviewer's only substantial criticism of an excellent study.

Some of the results are of practical and academic importance, and the book is essential reading to all with a bona fide interest in industrial absence. Unfortunately, circumstances did not permit greater depth of enquiry (including personal interviews) into the causes of absence, especially short-term absence. Perhaps they will later; industry, especially the nationalized industries, has a responsibility in this field.

P. FROGGATT


The problem of coal-workers' pneumoconiosis as well as other pneumoconioses is to correlate all the various measurable aspects of the disease, e.g., length of exposure, pathology, radiology, and physiology. This book describes a study of the relation between the latter two of these, but within these limitations the findings are of considerable interest. The author has been at pains to find out the effects of pneumoconiosis itself, to the exclusion of complicating factors such as age, bronchitis, emphysema, and psychological influences due to compensation problems. He has done this by selecting a group of coal-miners aged 35 to 45 with no complaints, still at work, having been exposed to dust for at least 10 years and with x-ray categories ranging from Z to C. Further possible cases of bronchitis and emphysema not so excluded were eliminated if the RV/TLC ratio was greater than 40%, or if the F.E.V.1 fell below an expected value. The final group comprised 101 miners and 16 surface workers of the same age group acting as controls. The results of tests of ventilatory capacity showed a significant correlation of F.E.V.1, V.C., and F.E.V.1/V.C. ratio with x-ray changes from category 3 onwards. Blood gas studies at rest showed some arterial desaturation from category 2 onwards, but these changes were poorly correlated with the radiological grade. Of greater significance were the changes of SaO2, PaO2, A-aO2 difference on exercise due to reduction of the scatter of observations (probably because the increased blood flow eliminates the ventilation perfusion imbalance seen at rest even in normal subjects). For example, it was common to find a man with category C changes with a satisfactory F.E.V.1, but rare to find one with a normal saturation or A-aO2 difference on exercise. No cases of hypercapnia were seen.

A group of 69 older workers, many suffering from bronchitis and emphysema, was examined, and again it was shown that exercise desaturation was a better guide to the x-ray category. Hypercapnia was present only in those miners with an F.E.V.1 of less than 1-2 litres. A further group of six miners in the terminal phases of

pneumonoisosis with cor pulmonale was studied with cardiac catheterization data on four.

In a more detailed investigation of cases from the original group of miners with isolated arterial desaturation, the diffusing capacity for oxygen was measured by the Riley method, and anatomical venous admixture by breathing 31.5% \( O_2 \) during exercise. Although the validity of these methods is open to question, the results show that neither of these factors is sufficient to account for the major portion of arterial desaturation in pneumonoisosis. Distribution of inspired gas measured by the nitrogen wash-out technique was found to be abnormal in 29 to 31.5% of cases of simple pneumonoisosis and 45% of cases of complicated pneumonoisosis (details of these experiments are published elsewhere). From these results by a process of exclusion the author concludes that the most potent cause of desaturation is ventilation perfusion inequality. This conclusion is in keeping with modern concepts but will await the application of recently developed techniques for experimental verification. The author devotes two chapters to methods and techniques employed, and all chapters are amplified by a discussion and review of the literature. The final chapter is devoted to the practical use of parameters of respiratory function in assessing disability, particularly in relation to Belgian law, and stresses that the F.E.V. is still the best test. Exercise desaturation, although a more specific test, does not necessarily imply incapacity, but its presence should alert one to the possibility of development of pulmonary hypertension.

The book is well worth the perusal of anyone interested in pulmonary physiology and its relation to coal-workers' pneumonoisosis. There is a five-page summary in English.

J. D. Abernethy

Occupational Disease in California attributed to Pesticides and other Agricultural Chemicals. Copies are available free upon request as long as the supply lasts from the Bureau of Health Education, California State Department of Public Health, 2151 Berkeley Way, Berkeley 4, California.

This report is in ways a model of what a report should be. The main text not only gives a clear account of its subject, which leads the reader easily through a fairly intricate break-down of the data, but also places the subject in its larger context. The data are presented in full in reference tables at the end. The increase in clarity and ease of reading fully justifies the repetition involved.

But there is a caveat. At various points in the text and in the title the phrase 'attributed to pesticides' is used. It seems reasonable to doubt whether such attribution by physicians, some of whom presumably had no great experience in diagnosing the effects of agricultural chemicals, was always correct, and no evidence is given that these cases were followed up or confirmed by experts in the field. This impression finds confirmation in the report. Skin effects accounted for 60% of the attributions, and in half of these the chemical believed to be responsible was not stated. This is a pity. California provides the most extensive 'field trial' in the world of the overall hazards of the use of pesticides. Probably nowhere else are they used so intensively, or within one State under a much wider range of climate, from the temperate conditions of the San Francisco Bay area to the great heat in other regions. Some of the labour force, especially in the San Joaquin Valley area, is not highly skilled, and is also Spanish-speaking, so that there were language difficulties in conveying information on safe practices, which was reflected in a higher incidence of poisoning. And the Bureau of Occupational Health is obviously well qualified to extract the most from the results. As it is, there is at least a chance that the incidence of minor cases has been exaggerated, and the figures quoted must be regarded as maximal for the groups covered.

The report does not cover the self-employed or family labour, which represents about one-third of the total labour force, and, of course, it excludes amateur gardeners. Of those covered, the incidence of cases was 2.2 per 1,000 amongst agricultural workers, but 5.1 per 1,000 amongst contract sprayers and the like. Warehouse workers and loaders provided 11% of the cases. The figures represent a fall of 9% on the previous year. The organic phosphate insecticides were responsible for two-thirds of the cases of systemic poisoning, and one of them, Parathion, caused the only fatality. The worker absorbed it through the skin from a splash on his trousers. He was wearing a respirator and rubber gloves, and his apparent ignorance of the danger from skin absorption suggests a serious failure to convey essential information about this and many other pesticides.

A particularly tragic figure is given which is incidental to the main subject. In the period 1951-63 70 children died from agricultural poisonings. In the same period there were 26 occupational fatalities. Adults can be educated to use these materials safely, and, as the Report shows, some success has been achieved. Children can only be protected by a sense of responsibility in adults.

D. F. Heath


Under various titles and as officers of the Ministry of Labour or the Ministry of Health, most countries employ physicians with a legal responsibility in occupational health. It was to bring together such physicians to discuss their mutual problems that the I.L.O., in collaboration with W.H.O., arranged this symposium, the first of its type since 1926.

Several I.L.O. instruments (Conventions and Recommendations) contain provisions regarding the need for qualified persons to assist inspectorates in maintaining high standards of working conditions, but in the changing field of occupational health it was felt that there would be advantage in taking stock of the present position to compare practice and training in the advanced countries in order to help the developing countries to organize their medical labour inspectorates.

The subjects discussed were: (a) the role, functions, and responsibilities of the medical labour inspectorate; (b) the technical and administrative powers required by the