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

Coalminers' Attendance at Work. The report of an investigation by a National Coal Board research team. By R. B. Buzzard and F. D. K. Liddell. (Pp. 180; 42s.) Medical Research Memorandum 3. London: National Coal Board (Medical Service). 1963.

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 $\sqrt{x}$ 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

L'Exploration Fonctionnelle Pulmonaire dans la Pneumoconiose des Houilleurs. By L. Brasseur. Hasselt, Belgium: Institut d'Hygiène des Mines. 1963.

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

*Irwin, J. O. (1943). *J. R. statist. Soc. A*, 106, 143.