chelating agents and their stressing the contraindication of dimercaprol (BAL) in acute poisoning are welcomed.

This excellent bulletin includes an account of the strange environmental Japanese 'itai-itai' disease. These are cases of bone and joint pain occurring in a proportion of elderly women living in the vicinity of old mine workings where cadmium, lead, and zinc have been mined. Rightly or wrongly, this disease has been ascribed to exposure to cadmium.

This publication would be very useful to any industrial medical officer or industrial hygienist concerned with the protection of persons exposed to cadmium or its compounds in their work.

J. A. BONNELL

ICRU Report 19. Radiation Quantities and Units. (Pp. 21; \$2.50). ICRU Publications, P.O. Box 30165, Washington, D.C. 20014, U.S.A. 1971.

In aspects of occupational medicine which involve radiation the physical quantities and units used must be chosen with extreme care. An international body concerned with units (ICRU) had to be established (1925) before progress could be made in setting acceptable levels of exposure to radiation. Any system of radiation units must serve many purposes. It must be useful in relating quantities measurable external to a worker or patient, to quantities resulting from his interaction with the radiation; and it must also provide a language which is useful for discussing the biological mechanism of radiation effects in man. For many years the roentgen was used both as the unit of environmental exposures and as the unit of dose received by a man exposed to that environment. In the last 20 years the distinction between the environment and the absorbed dose has been clarified and additional physical concepts (such as kerma and dose equivalent) have been introduced.

By 1962 the family of units was essentially complete, and the last ICRU report issued in 1968 contained only limited modifications. It provided a self-consistent set of concepts for adding the effects of different sorts of radiation, and even for adding the effects of inhaled or ingested radioactivity to those of external irradiations.

The present report retains the same fundamental units without altering their meaning or range of applicability. However, some of the formal definitions have been made more rigorous and, although this will not affect their use in industrial hygiene, it will avoid ambiguity in theoretical studies. The most valuable additions in the present report are those concerned with microdosimetry, a growing subject which is proving important in radiobiology. To accommodate differences between stochastic processes and the mean (or expectation) value when many such processes occur in a finite volume, it has been necessary to introduce very precise language. Some of the consequential changes in nomenclature will be noted with regret, for example, Integral Dose becomes Mean Energy Imparted.

A departure from previous Reports is the publication of a separate section, Part II, dealing specifically with Quantities and Units for Use in Radiation Protection. This part of the Report introduces two new quantities, Absorbed Dose Index and Dose Equivalent Index. These indices are maximum values in a tissue equivalent sphere of 30 cm diameter. Many physicists will question the

need for introducing further quantities into an apparently complete family, and it is certain that many industrial doctors will suspect that the study of 30 cm spheres may divert effort from the main objective of protecting workers. There is an urgent need to examine the quantities used in radiological protection, some of which are so poorly defined that several interpretations are possible. The present Report gives little hope that ICRU intends to perfect a self-consistent set of units which can be unambiguously applied to radiological protection. The new quantities, Absorbed Dose Index and Dose Equivalent Index, are unlikely to find general acceptance, and it seems improbable that the Report will have any impact on the operational aspects of radiation protection. However, the clarification of fundamental quantities and units, which provide the language for advancing the physical and radiobiological basis of health physics, is well done and welcome.

J. A. BONNELL

Digest of Pneumoconiosis Statistics 1970. (Pp. 17; 11 tables; 41p). London: H.M.S.O. 1972.

This annual report appears in a slightly changed format but the contents are essentially the same. The overall figures for pneumoconiosis give no reason for satisfaction and appear to have been more or less static over the last few years. In coal mining, for example, boardings at which the disease was first diagnosed have not significantly decreased since 1966. The situation in the coal mining industry is further illustrated by the rate of boarding in Doncaster, which in 1970 was 4.6 per 1 000 wage earners overall compared with 1.8 in 1968, and in East Wales, which was 6.2 per 1 000 in 1970 and 3.2 in 1968.

In industries other than coal mining the number of boardings shows the same tendency to remain static during this period with the exception of asbestos working in which the numbers diagnosed are higher than in the previous two years. Coal mining still accounts for over 65% of the new pneumoconiosis cases diagnosed, and pottery manufacture, slate mining and quarrying, iron foundries, and work with asbestos stand out as the problem industries.

In the year under review, 44 men (4%) were given a 100% disablement assessment but the great majority of boardings were less than 40%. Most men in whom pneumoconiosis was first diagnosed were over 45 years of age, but it is significant that 21 men in the coal industry and 9 men who had worked with asbestos who were accepted at boardings during 1970 were under 40 years of age. The number of deaths also appears to be rather static and 870 death benefits were awarded in 1970, the average over the preceding four years being 867. The total number of men who are in receipt of disablement benefit is falling very slowly year by year but there are still over 46 000 of them. These include 150 coal miners and 80 men from other industries who are all under the age of 40 years.

For coal miner's pneumoconiosis the overall rate per 1 000 of all wage earners employed is 2.7, the range being from 0.4 (Northumberland) to 6.2 (East Wales). In 1964 this overall figure was 2.4 per 1 000.

The slow improvement in eradicating the dust diseases is disappointing, particularly where the effort has been

sustained and large sums of money have been spent. Not all dusty industries, however, have taken sufficiently drastic steps to provide safer working conditions and, as this report shows, more effort is still required to prevent pneumoconiosis.

R. I. MCCALLUM

Methodology in Human Fatigue Assessment. Edited by K. Hashimoto, K. Kogi, and E. Grandjean. (Pp. xxx + 200; 39 tables; 71 figures; £3.50). London: Taylor and Francis. 1971.

If I remember my medical history rightly, in the first world war the Medical Research Committee (as it was then called) possessed an Industrial Fatigue Research Board, but by the time of the second world war this title had changed to Industrial *Health* Research Board. This represented a significant change in thinking about 'fatigue' still not completely transmitted to those who work and talk about it. Fatigue is an opaque idea but still good for a symposium about every 15 years—and this publication represents the most recent of these. Medical men, physiologists, and psychologists cover the field well. There is a lot of talking about fatigue, some of it not very clear; for example, there is a paper which discusses the 'relations between the symptoms and the feelings of fatigue' and another which sets up a mathematical model of the phenomenon based upon a questionable analogy, but which can, of course, be studied by computer.

However, this is the last word on the subject and, as such, is worth a place on the shelves of those whose speciality it is.

R. C. BROWNE

Précis de Toxicologie Industrielle et des Intoxications Professionnelles. By R. Lauwerys with the collaboration of F. Lavenne. (Pp. 553; 900 FB). Gembloux: Duculot. 1972.

A note on the dust cover of this book says that its accent is on recent work in the toxicology of industrial chemicals and that it is essential for those engaged in industrial medicine and hygiene, and for the French-speaking members of this group this is probably correct. The book is used as a textbook for the theoretical part of the author's course in industrial medicine at the Catholic University of Louvain.

The text is divided into two sections. The first part (77 pages) deals with general aspects of toxicology, routes of entry of poisons, evaluation of toxicity, mechanisms of action, etc. while the second part (476 pages) relates the toxicology of specific chemicals in a way familiar to us from the works of the late Ethel Browning.

For the experienced practitioner in industrial toxicology the first part of the book contains nothing new, although he may like to refresh his memory in the chapter on the biochemical mechanisms of action. However, for the student and perhaps particularly for the non-medical hygienist or engineer, this first part, in its lecture note form, provides a clear, concise account of the essentials with some useful statements such as those on the difference between toxicity and hazard. The author's biochemical interests are apparent throughout this section.

The second part of the book deals with a very wide range of chemicals—metals, hydrocarbons (including halogenated), gases, vapours, dusts, chemicals used in the plastics industry, pesticides, rodenticides, herbicides, fungicides, and many others. In most cases the information given is short but useful. A major feature of the book is the very full lists of references to both European and American literature which have been collected from a wider selection of journals than usual in a work of this type. The author is also suitably cautious about the claims which have been made for the carcinogenicity of some of the chemicals discussed. Where possible, notes on the relevant Belgian legislation have been included.

Although the Threshold Limit Value is given for each compound where it has been decided, there are practically no LD₅₀ data in the book. This exclusion is so complete as to be deliberate. The author has obviously gone to considerable trouble to provide fatal doses for man whenever possible. Although one does not wish to over-emphasize the importance of LD₅₀ data and although one realizes that the book is mainly concerned with effects on man, nevertheless the addition of some LD₅₀ values would increase the book's general usefulness, particularly since these values are often required for classification for labelling. This defect could be corrected for the second edition.

When the author comes to revise his book he will have to do something about the last seven chapters which occupy 65 pages. One can see how these chapters fit into a lecture course, but they should be either expanded or left out of the book. Just to provide a list of solvents, as in chapter XX, is not very useful. The chapter (XXIII) on industrial cancers is particularly bad, and it is not possible to deal with the mechanisms of carcinogenesis in two pages, even in a précis. Despite these shortcomings, the author is to be congratulated on producing a very useful book for his students.

H. B. STONER

National Coal Board Medical Service and Medical Research Annual Report 1970-71. (Pp. 40; 17 Tables; 5 figures; £1.00). London: National Coal Board. 1972.

This is a discreetly glossy report in Oxford/Cambridge blue and black. There is a section on medical examinations, and a long and interesting one on the protection from health hazards, of which by far the most important is dust. This is followed by a consideration of injuries and their treatment, and of the first-aid organization. The report includes a list of the staff, publications, and research advisory panels which have the task of advising the chief medical officer. The document makes interesting reading for any medical man who works in a coalmining area; for example, each area doctor does about 1 600 examinations per year. Ninety per cent of juveniles are fit for any job in coalmining, as are 82% of 'adults', so that the cost of detecting a single unfit juvenile is pretty high. The fact that the men and their Trades Union hold the Medical Service in high esteem is illustrated by the statement that they seek as many as 22 000 consultations per year.

Dust is the most important medical environmental