With rising public concern about the quality of life and environmental pollution, many doctors, and especially those with industrial responsibility, are increasingly concerned with the hazards arising from the use of industrial materials. In the past such hazards have been mainly toxicological in character, and only recently has attention become focused upon the more insidious, more complex, and potentially more serious problems of carcinogenicity and teratogenicity. Although the published literature can now provide us with a wealth of information relating to specific carcinogens and teratogens such as thalidomide, certain aromatic amines, asbestos, mineral oils, and most recently vinyl chloride monomer, there is still a relative lack of basic information about the fundamental nature of the problem.

This report of the World Health Organization Scientific Group undoubtedly helps to fill this gap. With the certainty that the future will reveal the presence of many as yet undetected carcinogens, it is vitally important that proper attention should now be given to the evaluation and assessment of potentially harmful industrial chemicals.

The expertise of those who have compiled this booklet is undoubted, and it is a valuable function of international bodies such as WHO that they should be instrumental in securing this collaboration. After a brief introduction which makes the point that a major problem is that of exposure to very low levels of carcinogenic substances which may be present only as a contaminant or as a chemical impurity, the authors proceed to discuss the definitions, mechanisms, and interrelationships of mutagenesis and carcinogenesis.

Although the authors offer no firm conclusion as to the existence of threshold or no effect levels of exposure to carcinogens, there is a useful discussion of this important topic, and the point is made that there is no escape from an irreducible environmental background level of cancer inducing compounds such as aflatoxins and polycyclic hydrocarbons.

In presenting their conclusions the authors are chiefly concerned to pinpoint those areas in which further research is most needed. They stress the dangers of reliance upon *in vitro* testing, and would like to see further development and experience with mammalian test systems. They suggest the possibility that mutagenicity tests might usefully be employed as prescreening tests for carcinogenicity but recognize the important role of carcinogens. Finally, they make specific recommendations for action which should be promoted in the future by the World Health Organization.

In an interesting annex to the publication there is set out a proposed procedure for the assessment of health hazards of carcinogens at very low levels of exposure. This discusses and evaluates techniques for the extrapolation of low level risk from observations at much higher levels, and for the development of a mathematical model to compare dose response relationships in cancer induction with those for age at occurrence.

Much of this information will be of interest and value to the practising occupational physician. From his point of view, however, it is disappointing, and even surprising to note the omission of any consideration or mention of the role of the epidemiologist. Perhaps the terms of reference for the working group excluded this, but one

would certainly expect to find a section dealing with this important aspect in any more comprehensive report.

H. G. PARKES

An Investigation of Factors affecting the Use of Buses by both Elderly and Ambulant Disabled Persons. By B. M. Brooks, H. P. Ruffell-Smith, and Joan S. Ward. (Pp. 109; no price stated). London: British Leyland Motor Corporation Ltd. 1974.

This is a report of work undertaken by British Leyland (UK) Ltd under contract from the Transport and Road Research Laboratory. The investigators carried out tests with a mock-up static bus body to study the ability of 100 elderly people and 100 patients with neurological and orthopaedic disabilities to negotiate steps of various heights, to pull, twist, and reach with their arms, and to note their preferences for various seating arrangements and handholds.

The report consists mainly of tables of the relevant anthropometric dimensions of the subjects and their abilities to carry out various tasks and their preferences. The height of entry and exit steps seems to be the dimension that has the most effect on current bus usage by that part of the population represented by this sample.

It is concluded that if the population sample is a representative one, nearly four million persons in the United Kingdom would be unable to negotiate the present legal limit step height of 17 inches, and about half a million could not manage the modern designs with step heights of 10½ inches. For easy entry by 90% of the population 65 years old or more, the step height would need to be 7 inches.

Though the results have limited application in industry, the investigation and the report are a model for others to copy.

P. A. B. RAFFLE

Sub-clinical Lead Poisoning. By H. A. Waldron and D. Stöfen. (Pp. 224; 55 figs; £5.50). London and New York: Academic Press. 1974.

Although lead is still one of the most important industrial poisons at the present time, the incidence of industrial lead poisoning has dropped sharply during the present century, no doubt because of the application of vigorous preventive measures. In 1900, 1 058 cases of lead poisoning, of which 58 were fatal, were notified, whereas in the annual report of Her Majesty's Chief Inspector of Factories for 1971 the number of notifications of industrial lead poisoning was 123, of which no case was fatal. Constant vigilance is, of course, necessary to maintain and even improve on this good industrial record, but the wider consideration is now the effect of environmental lead pollution on the whole community. This introduces the subject of subclinical lead poisoning, which may be defined as the possible and yet unproven effects on community health of an increased exposure to lead insufficient to cause frank lead poisoning. Although the book under review is named *Sub-clinical Lead Poisoning*, only 20 pages of it out of a total of about 160 are in fact devoted to this particular subject. The remainder is an essential review of literature on lead in the environment.

lead metabolism, pathological effects of lead, diagnosis, prophylaxis, and treatment. The authors have rendered a valuable contribution to workers in this field by their summation of a large number of references, with the appropriate information suitably presented. The span of the subject covered is so wide that the authors at times reveal the limitations of their experience and knowledge in certain aspects of the field. For example, on page 81 they state that 'protoporphyrin may occasionally be detected in increased amounts in the urine in lead poisoning' (Waldron, unpublished data). The findings of a dicarboxylic porphyrin in the urine would indeed be such a unique event that the author should rush this into print as soon as possible. In their presentation of the symptomatology of acute intermittent porphyria and lead poisoning, they come to the conclusion that the common symptomatology is co-incidental and is not indicative of a common underlying metabolic disorder. In coming to this decision the authors have made an incomplete statement of the present enzyme defects in acute intermittent porphyria (e.g., depression of uroporphyrinogen synthetase) and they fail to recognize that we are unaware at present of the underlying metabolic disorder in both of these conditions, and therefore it would seem rash to come to their conclusion at this particular time. Their clinical and therapeutic appreciation, although competent, lacks a completeness of the knowledge of the literature which other aspects of the book show. A few spelling errors occasionally mar the script.

Nevertheless the authors have made many excellent points in their appreciation of the present problem of subclinical lead poisoning. They point out, for example, that the present threshold limit values apply only to adult males and thus their application to whole populations, especially children, is inadmissible when assessing health standards from airborne lead. Their appreciation of sources of lead and its effects on certain tissues is good, although recent work is moving so rapidly that it is partly and unavoidably out of date. Finally, they have summarized and adopted certain conclusions about the general problem of environmental lead pollution. The whole subject has become controversial and one which has been obfuscated by frenetic overkill at both ends of the spectrum of controversy. The reviewer believes that the truth might unfold somewhere between these two extremes. As the authors point out, 'there is no justification in assuming that individuals are in a state of lead balance in view of the unequivocal evidence that total body burdens of lead rise with age, due mainly to increasing skeletal deposition. Further, increased dissemination of lead into the environment is certain to add to the body burden by increasing exposure through the air and diet'.

The collection of evidence of metabolic and other effects, particularly in children, suggests that it is wise to keep lead exposure to a minimum. On balance this book therefore has made a significant contribution to environmental health.

A. GOLDBERG

The Practical Management of Head Injuries, 3rd edition. By John M. Potter. (Pp. 98; 8 figs; £2.00). London: Lloyd-Luke Medical Books. 1974.

This is the third edition of one of the most valuable small books on head injuries which is available. It is not intended for neurosurgeons but for doctors and senior nurses who on occasion are responsible for the care of these cases. The book is dedicated to one of the author's teachers, the late Sir Hugh Cairns, the pioneer of crash helmets for motor cyclists. As a direct result of his work protective helmets are now worn by many more workers in industry, with the consequence that the mortality and morbidity from head injury has fallen considerably. The majority of head injuries are due to road accidents but many cases still arise in the dockyards, mines, etc. Nursing staff in the ambulance rooms of these industries are likely to benefit by having a copy of this small treatise on head injuries close at hand. From their point of view Chapter 2, where the author describes the management in casualty departments, will prove to be the most valuable. The short chapter on convalescence, rehabilitation, and sequelae will appeal to the audience to whom the book is addressed. The considerable experience of the author is well displayed and also his ability to distinguish and emphasize the most important aspects of his subject.

The book is reasonably priced and well printed with a small number of excellent line drawings. Doctors and senior nurses who have contact with cases of head injury will find this book well worth buying.

L. P. LASSMAN

Forensic Toxicology. Proceedings of a symposium held at the Chemical Defence Establishment, Porton Down, 29-30 June 1972. Edited by B. Ballantyre. (Pp. 157; £4.25). Bristol: Wright. 1974.

Toxicology is the science of poisons and embraces many fields which are often compartmentalized. There is the impact of chemicals or drugs on man when exposure is occupational or environmental or during medical treatment. This report of a symposium is intended to cover forensic toxicology defined in the preface as 'a specialization dealing with the legal and medical aspects of the detrimental effects of chemicals on humans'. Of paramount importance for forensic toxicology, as for the other branches of toxicology, is the diagnosis of the cause of the poisoning. For gross exposure the analytical problems and clinical picture can often be definitive, but with the growing number of highly active chemicals the problems become very acute. Decisions on diagnosis or hazard require knowledge of mode of action, and often sophisticated biochemical and analytical methods are utilized. At this level forensic toxicology becomes almost indistinguishable from other branches which this volume illustrates well. The contributions range from discussion of techniques to the mode of action of hallucinogens or lead. The chemicals discussed include barbiturates, morphine, methadone, hallucinogens, anticholinesterases, paraquat, cyanide, carbon monoxide, lead, and mercury.

This small volume will provide interesting reading for all those concerned with exposure of man to chemicals. The papers are well written and, because they are not definitive reviews overlaid with references, easily read. The collection together in one volume of contributions with such diverse aims reinforces the view that only a