by soft and loud auditory signals, to the reaction time to a light signal were studied by D. Carroll. The reactions were correlated with sympathetic vasoconstriction and vasodilatation in the forehead skin. The results are not too convincing and one wonders whether more positive findings would have been obtained from the reactive finger pulse.

Moderate physical exertion improved and severe physical exertion impaired performances in a mental task, leading C. P. Davey to conclude that the inverted U relationship depends on the level of arousal. C. J. Cooper considers the theoretical basis for the facilitation of mental function by moderate exercise as part of the neural pattern in the physiological arousal response. There are two contributions on heat as a stress by R. K. Macpherson and K. A. Provins and his colleagues. The importance of heat as a stressor in everyday life has perhaps been rather overplayed in the past. C. Cameron reviews work on fatigue and concentrates on the difficulties inherent to its definition and measurement; a satisfactory theory for fatigue is not yet available. D. Ferguson reports the results of a study of absenteeism and illness in relation to personality traits and working conditions in a large Australian concern. Usefully, but not surprisingly, the need for improved job selection procedures and re-organization of working conditions to increase job satisfaction emerge as important conclusions.

There are all too few objective tests which are capable of predicting an individual's liability to a breakdown at work. R. Welch's finding that Hettinger's vibrator equipment can identify individuals with a proneness to tenosynovitis is therefore welcome. Work found to be suitable for retardates compared with psychiatric cases in a rehabilitation workshop is considered by J. C. McEwen. The value of sleep patterns as an indicator of stress in everyday life and increased adrenocortical activity is considered by M. D. E. Goodyear, while M. W. Johns examines the role of psychosocial stress in the genesis of coronary heart disease. He rightly points out that because it is difficult to measure its importance it has almost certainly been underestimated compared with quantifiable factors such as diet, hypertension, male sex, and cigarette smoking. The final contribution by I. Pilowsky looks at psychiatric aspects of stress and examines the tendency for diseases to occur in 'clusters' which frequently follow a life change or series of life changes.

This reviewer always faces the task of reviewing a book derived from a symposium with a sinking heart and it usually proves well justified. This book has proved the exception and much credit clearly goes to the editor for hard spade work both before and after the meeting.

R. H. Fox

Occupational Health Problems of Young Workers. S. Forssman and G. H. Coppée. (Pp. 143; 10 Sw. Fr.) Geneva: ILO. 1974.

It has been said that considering the store of wisdom available in the world it is astonishing how little is used in the government of men. Certainly this is true of young people in the educational and industrial fields. There is wisdom in this book but rather heavily expressed and

indigestible. A lot of sifting is required, and there is repetition and even contradiction. It is clearly a condensation from many sources, and some indication of the authors' experience and background as well as a bibliography would be useful.

The book is subdivided into sections covering social, psychological, physiological, and sexual development; transition to industry, and the industrial physician. In effect, only large firms and their staff are considered. It is a pity that more attention is not paid to the implications of theory and the integration and coordination of school and work, and medical and social services for young people. The concept of the work of industrial physicians in relation to young people is clearly dependent upon improved team work and recognition of the indivisibility of education and medicine. Continuity of care is essential in the process of maturation of the young. The 'crisis of identity' takes place largely during the early years at work.

Some of the inadequacy of the book is shown in the historical section which gives much of little space to the United Kingdom. Here it is inferred that young children were barred from chimney sweeping because of occupational cancer, and it is inaccurate and superficial about developments in the vital fields of medical and educational supervision. It should be a matter of pride to the medical profession that the pioneer work of general practitioners acting as certifying factory surgeons did much to improve the lot of young people and stimulate the establishment of part-time education. Indeed they helped to establish universal primary education and registration of births, and finally, the school health service and the Factory Medical Department. They represented a general service not restricted to the larger firms, and among them were many pioneers of occupational health. The service finally died of neglect and denial of experiment.

Then as now the better firms did most to promote continuing education and assist maturation. Their work and this book underline how little we know about 'need' in relation to adolescents, and how inadequate it is to try and select special categories and ignore the rest.

More space could usefully have been given to the educational social and personal implications of earlier maturation and the difference between chronological and biological age. These factors have important implications for occupational health and industrial efficiency.

Regrettably this book did not come out before legislation was passed for reorganization of the Careers Service and the creation of the Employment Medical Advisory Service which abandoned care of young people except as specimens. Both services, so vital to occupational health, show a woeful lack of appreciation of the problems raised even in the foreword of this publication. Readers must surely feel unease at present developments in Great Britain.

M. E. M. HERFORD

Assessment of the Carcinogenicity and Mutagenicity of Chemicals. Report of a WHO Scientific Group. Technical Report Series 546. World Health Organization, Geneva, 1974. (Pp. 20; Sw. fr. 4). Geneva: WHO. 1974.

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.