Book reviews

Problems Arising from the Use of Asbestos. Memorandum of the Senior Medical Inspector's Advisory Panel. (Pp. 35; 3s. 9d.) London: H.M.S.O. 1967.

Dr. T. A. Lloyd Davies is to be congratulated on both setting up this advisory panel and producing this memorandum. His panel is well chosen, representing academic and practical experts with a keen interest in this particular problem, so that it is not surprising that the report is an excellent summary of the present position in the British asbestos industry. The report does not underestimate the problem that has been created by the rapid expansion in volume and variety of asbestos usage just at a time when the dangers of late development of malignancy have been recognized. It emphasizes the unsatisfactory conditions which still exist in some parts of the industry. The recognized deaths from asbestosis are still rising—18 per year on the average for 1951–60 whereas 64 died in 1966 and of these 30% and 66%, respectively, died of lung cancer or mesothelioma. It also points out that there may be similar unsatisfactory working conditions in other trades using asbestos which have not been recognized.

In formulating their recommendations the panel discuss both the evidence from industry concerning the effect of safety measures and the epidemiological evidence relating mesotheliomas to crocidolite exposure. They point out that whereas satisfactory safety standards can now be laid down for the factory use of chrysotile, standards for the factory use of other forms of asbestos, especially crocidolite, can only be guessed at. Similarly, the use of asbestos and asbestos-containing materials in other industries is as yet uncharted territory apart from the insulation workers.

With respect both to standards of safety and to crocidolite and mesotheliomas the panel point out the need for further research before precise recommendations can be made.

The panel strongly recommend that all asbestos-exposed workers, whether they are in trades already known to be hazardous or not, should have a pre-employment examination and regular periodic examinations. They require this for the early detection of evidence of pulmonary fibrosis in the hope that exposure levels sufficient to cause asbestosis or cancer of the lung can be stopped as soon as possible. They doubt the value of periodic examination for the prevention of mesothelioma and are unwilling to specify the stage at which an asbestos worker should be withdrawn from further exposure.

It is against the background of this memorandum and the equally good *Hygiene Standards for Chrysotile Asbestos Dust* issued by the British Occupational Hygiene Society that the current 'Draft Regulations' should be viewed and found wanting.

P. C. ELMES

Hygiene Standards for Chrysotile Asbestos Dust. (Pp. 28; no price stated.) Oxford: Pergamon Press. 1968.

This little booklet is of considerable importance for all those concerned with the prevention of occupational disease. It contains the first satisfactory attempt to base a hygiene standard on the analysis of quantitative morbidity and exposure data. Admittedly this is limited in its application to one kind of asbestos, chrysotile, and is probably only useful for the prevention of pulmonary fibrosis rather than the malignant diseases which can also follow exposure to asbestos. But nevertheless it represents a considerable step forward as a method of preventing an industrial disease: it is a pity that official policy falls short of this standard.

The studies upon which the standard is based were carried out at a factory where the exposure is virtually limited to chrysotile asbestos fibres. Morbidity and mortality studies have already been published (Knox, Doll, and Hill, 1965). The dust exposure of the occupational groups was derived from sampling by various methods from 1951 onwards. Estimates are used to assess the exposure between 1933 when the old Regulations became effective and 1951 when dust sampling was started. It is assumed that fibres shorter than $5\ \mu$ are not important.

The very distinguished committee who have assessed the data estimate that an exposure of 100 fibre yrs per cm^3 (whether this is 2 fibres/ cm^3 for 50 years or 20 fibres/ cm^3 for 5 years) is the maximum permissible allowed for any worker as this may be associated with a 1:100 chance of developing clinical asbestosis during the man's working life.

They recommend that no one should be allowed to exceed this total exposure and detail the methods of protection which should be used at the various dust levels.

Furthermore, they make the very important recommendation that these measures should be supplemented both by recording each man's exposure and by medical supervision with periodic examination. On the basis of such continued supervision they recommend that the

standards should be modified periodically so as to maintain the desired level of safety.

Chrysotile dust is probably the least dangerous of the asbestos fibres used commercially in this country, because (1) the fibres are curly so that a relatively small proportion are retained in the lung, (2) they may disappear from the tissues faster than the other types, and (3) because the association with malignancy seems only significant when the dosage is high enough to cause asbestosis. Therefore the standards laid down in this booklet should be regarded as the minimum to which more extensive controls should be added for the protection of workers with other kinds of asbestos.

P. C. ELMES

Reference

- Knox, J. F., Doll, R. S., and Hill, I. D. (1965). Cohort analysis of changes in incidence of bronchial carcinoma in a textile asbestos factory. *Ann. N.Y. Acad. Sci.*, 132, 526.

Cancer Epidemiology: Methods of Study. By Abraham M. Lilienfeld, Einar Pedersen, and John E. Dowd. (Pp. 165; illustrated; tables; 62s.) Baltimore: Johns Hopkins Press. London: Oxford University Press. 1968.

For some time a plain statement about how problems of cancer aetiology can be tackled has been needed; this book goes a long way to meet this need. It is directed at people who are not specialist epidemiologists, although they may be working in the cancer field. It should also be a very valuable help in teaching at both the undergraduate and post-graduate level.

It contains chapters dealing with the nature of epidemiology and what can be learned from it; with the important idea that cancer is a term covering a group of diseases with only some features in common; with the underlying principles of prospective and retrospective surveys; and with the uses and limitations of morbidity and mortality studies. Commonly used simple statistical methods are described in an appendix, and the WHO classification of neoplasms is given in another appendix.

Taken as a whole, I think that this is a very good book which should be read by all people interested in environmental cancer research.

Unfortunately there are blemishes, some trivial but one at least serious. Several chemical names are wrong—B- and L-naphthylamine for β - and α -naphthylamine and 9:10 dimethyl chloranthrene for 9:10 dimethyl cholanthrene—in both the text and the index. Aniline is indexed under the heading 'carcinogens' because the authors did not distinguish between substances investigated and substances incriminated when they discussed a survey of chemical workers. In fact, that survey showed that aniline was *not* carcinogenic.

R. A. M. CASE

The Carcinogenic Action of Mineral Oils: a Chemical and Biological Study. M.R.C. Carcinogenic Action of Mineral Oils Committee. Medical Research Council, SRS 306. (Pp. 251; 40s.) London: H.M. Stationery Office. 1968.

The fact that skin cancer is associated with occupational exposure to oils, tars, pitches, and soots has been known for many years and led to the now classic work of Kennaway and his school on the polycyclic aromatic hydrocarbons. Mineral oils used in the engineering industry as 'cutting oils' have been shown to induce cutaneous tumours in man. The Medical Research Council therefore decided to attempt to determine the nature of the carcinogens in these oils and how they might be eliminated. This report describes the way in which mineral oils from three sources were fractionated and the results of biological testing of the fractions. A number of pure polycyclic hydrocarbons were isolated, among which the triterpenoid lactone, oxyllobetulin-2-ene, is of general interest in indicating the vegetable origin of petroleum.

Investigations of this kind are tedious and require large-scale facilities for the assay of carcinogenic activity in experimental animals. These difficulties were overcome by enlisting the co-operation of a number of cancer research centres. The statistical analysis of the results provides useful information about the reproducibility of carcinogenicity tests carried out at different times and in different centres.

The testing of more than one fraction in an individual rabbit by the use of multiple testing sites was a further way in which the animal facilities were minimized. This is shown to be statistically acceptable although, to the reviewer, it appears not to be completely free from objection. The report is a substantial contribution to the study of the carcinogenic action of oils and tars. It suggests that solvent extraction is the most suitable way of reducing the cancer-hazard in the mineral oils. The reader may, however, be forgiven for wondering whether a less ambitious approach with strictly limited objectives might have given as much usable information at a much smaller cost.

D. B. CLAYSON

A Study of Road Accidents in Bombay E.S. & T. Undertaking. By O. N. Ganguly and R. G. Kasbekar. Central Labour Institute, Bombay. Industrial Psychology Division Report No. 4. (Pp. 94; no price stated). Bombay, 1967.

This is a report of some 94 pages together with appendices. It is a comprehensive attempt to investigate the causes of bus accidents in Bombay. A large amount of work has been done to show where most of the accidents occur; this also includes the severity, the time of day, the day of the week, and the month of the year. The figures are tabulated. Unfortunately the investigation was confined to two years only with a break in between. The accidents of each type of vehicle are also recorded. The above constitutes part one of the study.

The second part of the study is on the drivers' records. This includes age and experience, including pre-employment experience.

Part three is an analysis of the results of interviewing groups of drivers. Attempts were made to compare like groups of 'accident-free' drivers and 'accident repeaters'. The state of health, living conditions, family history, and attitudes to work were checked.

Unfortunately the accident report form used on which