The findings from these studies are presented in a comprehensive series of tables. Most of these are in Volume II; Volume I consists of text and main summary tables only. The main findings follow the familiar pattern found in other such studies; smokers have higher symptom prevalence than non-smokers; urban dwellers have more respiratory symptoms and lower ventilatory function than their rural and country town compatriots. The author compares his findings with those from British field studies and shows that these Dutch populations have a consistently lower symptom prevalence even when differences in cigarette smoking are taken into account. The tests for allergy, blood eosinophilia, and the intracutaneous skin tests showed no excess among subjects with chronic bronchitis. On the other hand, positive reactors to the histamine threshold test were more often found among the chronic bronchitics. These findings are as yet unexplained and are included, among other items in the summary, as requiring further investigation.

This is not an easy work to read. However, it is a useful contribution to chronic respiratory disease epidemiology and can be recommended as essential reading for anyone starting work in this field.

J. R. T. COLLEY

Permissible Levels of Occupational Exposure to Airborne Toxic Substances. Sixth Report of the Joint I.L.O./W.H.O. Committee on Occupational Health. World Health Organization Report Series No. 415. (Pp. 16; 4s.) Geneva: World Health Organization. 1969.

This booklet describes the international philosophy of permissible limits, and it points out that the limit set depends upon the biological response. It mentions the difficulty of assessing long-term effects, particularly when these are genetic or carcinogenic, and it stresses the limitations of laying down a limit when a few members of a working population display hypersensitivity. When reading this, our experience in this country with isocyanates comes to mind. 'Most' of the committee members favour a four-tier classification of the biological effects of occupational exposure, but it must be remembered that these effects will, in fact, form a spectrum. There is a paragraph on the problems of 'developing countries' which, it is said, need urgent study. But should these countries, one wonders, have limits any different from any other country? The speediest way of producing a safe working environment is probably to have a strict set of factory laws, strictly enforced with a dash of 'prep school' discipline – or is this an unacceptable old-fashioned approach? The differences in limits set by the western and eastern blocs are mentioned. These really reflect the problem of relating function to structure, or the behaviourist, as seen in Pavlov, to the morbid histologist, as seen in Virchow. The behavioural approach east of the Elbe in theory leads to lower limits which, in practice, cannot be worked to, and the final result is often less hygienic than would be the case in a western country. But this is also the result of an important difference in thinking between east and west. Eastern man tends to be more interested in the theoretical plan, but western (and particularly English) man on the final result

which he often reaches in a theoretically untidy way.

Some of the suggested limits differ by as much as a factor of 80, and the committee makes the very reasonable suggestion that a list of substances for high priority study should be compiled. It also suggests that international reference centres should be set up where methodology can be developed and standardized. Acute toxicity testing with two separate species of animals is put forward, but might it not also be worth considering whether, in addition, a pregnant group should not be included? We do not want the lesson of thalidomide to be wasted. But here the theoretician will doubtless object that thalidomide is the business of the department of pharmacology rather than that of occupational hygiene. If so, this pragmatic reviewer must ask, in reply, whether the biological organism can detect the finely drawn divisions of administrative structure.

As a discussion of many of the problems of permissible levels this pamphlet is well worth a place in the library.

R. C. BROWNE

Noise and Man. By William Burns. (Pp. 336; 50s.) London: John Murray. 1969.

Noise and Man is by far the best of a number of books published recently on noise and its effects on people. Just less than half the text is devoted to hearing, its measurement, deafness, and the effects of noise on hearing. The remainder covers the other effects of noise on people, acoustical physics, aircraft noise, and impulse noise. The book is well written and there is a lot of information in it but I am not quite sure whether it is aimed at the proper readership. According to the introduction it is intended for a wide range of specialists, not expert in acoustics, who may find themselves confronted by noise problems. Medical officers in local government and industry are specifically mentioned, and, as a reviewer, I looked at the book from their point of view.

Medical officers of health are likely to be interested in Professor Burns' advice on how to decide whether a particular noise is a nuisance for the purposes of the Noise Abatement Act. Unhappily, the Act receives no mention, and the discussion of annoyance from noise would not help very much with any practical problems on nuisance as a statutory matter which might be facing them.

An industrial medical officer might be seeking information on the prevention of occupational deafness. Professor Burns, following American thought, includes routine audiometry among his recommendations. Few authorities give really convincing reasons why this procedure should be adopted as a matter of course. Professor Burns advises us to do it, despite its pitfalls and obscurities, because of the variation in susceptibility between individuals. Elsewhere in the text he makes the point that if hearing protection is adequate audiometry would serve only to identify the individuals who are not wearing their hearing protection. On preservation of hearing he writes '... each person's hearing must be measured before employment and at intervals throughout the period of employment if a hazard is judged to exist'. Much depends on what is meant by that last phrase; if a hazard can be removed by providing ear defenders then it is clear that audiometry is seen as an alternative to

ear defenders. This is not really an acceptable alternative because we cannot prevent anything just by observing it. If, on the other hand, a hazard is judged purely in terms of noise levels then audiometry would be used as a 'long stop' to check on the effectiveness of hearing protection of individuals. Although audiometry is useful for group investigations it is not really accurate enough for meaningful interpretation of individual results, so that the technique is not likely to be an efficient 'long stop'.

Obviously there are situations in which audiometry would be a useful addition to straightforward preventive measures. Also routine audiometry provides the basis for much research. But there is no case for routine audiometry in every industry where there is a noise hazard.

I return to my point about the readership for *Noise and Man*. People interested in research will derive great benefit from the book; it will be of special value to anyone embarking upon research with an audiometer. Because the research interest is paramount it will not be quite so useful to people confronted by practical problems either inside or outside industry.

G. R. C. ATHERLEY

Introduction to Health Physics. By Herman Cember. (Pp. xi + 420; 100s.) International Series of Monographs in Nuclear Energy, vol. 105). Oxford: Pergamon Press. 1969.

The professional health physicist is usually a graduate scientist or engineer who has specialized and become an expert in radiological health and safety. This book provides a good general introduction to the subject for persons who have already received a sound scientific training and are beginning to specialize in this applied field. Its primary aim is to extract the relevant material from the various basic disciplines and to synthesize it into the foundations of the applied science of health physics. Nearly half the book is taken up with presenting this basic material while the remainder deals in outline with its applications throughout the field of radiological protection in atomic energy work and in industry, research, and medicine. The approach throughout is essentially quantitative with a free use of mathematics such as one would expect, for example, in a university textbook of engineering. Unfortunately, there are quite a number of typographical errors, some of which could be rather troublesome to the non-expert reader. It is to be hoped that these will be corrected in an early reprint. On page 11 is the surprising statement: 'All matter is electrical in nature and consists of extremely small charged particles called protons and electrons.' However, the neutron is introduced on page 56 as the 'third basic building block in nature' and the neutrino on page 70.

The foundation material reviewed in the first half of the book includes basic physics, atomic and nuclear structure, radioactivity, interaction of radiation and matter, radiation dosimetry, and biological effects of radiation. This last subject is presented only in brief outline in about 17 pages. In the latter portion of the book consideration is given to radiation protection standards and philosophy, health physics instrumentation, external and internal radiation protection, criticality for nuclear fission and radiological monitoring and surveys.

While warmly welcoming this new textbook as a valuable addition to the small number of such volumes hitherto available to the young professional health physicist, it must be emphasized that it is by no means a simple practical 'protection cookery book' for the laboratory technician or industrial administrator. Many industrial medical officers would, indeed, find the mathematics and physics decidedly difficult at times.

S. K. STEPHENSON

L'Intossicazione Acuta e Cronica da Trielina Aspetti Clinici e Medico-Legali Assicurativi. (Acute and Chronic Trichlorethylene Intoxication: Medico-legal and Compensation Insurance Aspects). By M. Canale and R. Cataldi. (Pp. 131; 284 references; L.1250.) University of Genoa. 1969.

This book includes a useful outline of the difficulties associated with the concept of the maximal allowable concentration for toxic substances used in industry, pointing out that differences in purity of the agent used, environmental, dietetic and metabolic factors from country to country stand in the way of fixing an international standard. Italy, France, and Belgium are the only countries of the European Community in which there are social security provisions for compensating the victims of trichlorethylene poisoning, assessment being based on clinical and laboratory findings. In France and Italy the period after exposure during which workers may claim compensation is laid down. In Italy, workers exposed to solvents such as trichlorethylene in a defined list of occupations are required to have periodic medical examinations.

The metabolism of trichlorethylene to trichloroacetic acid, trichlorethanol, and monochloroacetic acid and the excretion of these in the urine are described, as well as the excretion of the unchanged solvent in expired air and urine. The demonstration of chloral hydrate in the blood of human beings exposed to trichlorethylene has been referred to by French and Czech authors but has received little attention elsewhere. The authors emphasize the difference between excretion rates of trichloroacetic acid and trichlorethanol after single and continuous exposures, the latter being relevant in the industrial situation. The percentages of the absorbed trichlorethylene appearing as trichloroacetic acid in the urine of human subjects has been reported to vary between 5% and 35%. These wide variations found were thought to be due to differences in individual metabolism, period of total exposure, and dose received.

The various physical and chemical methods in the estimation of trichlorethylene in ambient and expired air are described. It is pointed out that most of the physical methods available, although very accurate, are not so convenient as chemical methods and depend either on the gravimetric estimation of chlorine liberated by the combustion of solvent vapour or on the estimation of the colour complex produced by the interaction of trichlorethylene with pyridine. Reference is also made to the Czech investigators who estimated trichlorethanol, after oxidation to trichloroacetic acid, and monochloroacetic acid by a paper chromatographic method.

Italian authors considered that trichloroacetic acid in urine alone was an inadequate index of industrial