modernization; they have been made sparingly and never at the expense of the clarity of the original exposition.

The chapter on the significance of the difference between two proportions now includes a short section on the null hypothesis. A number of changes have been made in the chapter on standardized death rates and indices. A new section shows how to use the technique, on which the standardized mortality ratio is based, in an experiment: 1 situation where the effect of one variable must be held constant in order to examine the independent effect of another. The section on the outmoded comparative mortality index has been eliminated and the dangers of standardization have been emphasized again. The chapter on clinical trials now includes a section on the use of matched pairs between and within patients. The second of the two valuable chapters on common fallacies has been enlarged to include a discussion on the vexed question of 'normal' values of measurable human characteristics.

The final chapter on statistical evidence and inference retains the excellent advice given in earlier editions. It emphasizes the theme which permeates the whole text, namely, that the valid interpretation of data depends mainly upon a common-sense appreciation of the data themselves while the statistical methods applied to the data are merely an aid to the application of common sense. The final section of this chapter, 'common sense and figures', has been admirably amplified.

E. A. CHEESEMAN

Bronchitis III. Proceedings of the Third International Symposium on Bronchitis at Groningen, Netherlands, 23-26 September, 1969. Edited by N. G. M. Orie and R. van der Lende. (Pp. 393; 206 figures; Hfl. 98.) Assen: Royal Vangorcum. 1970.

The first bronchitis symposium of the University of Groningen was held in 1960, the second in 1964, and the third, the subject of this volume, in September 1969. It had 48 participants including 10 from the United Kingdom, four from the New World, and many contributors from Europe, especially the Netherlands, all well-known experts in bronchitis. The proceedings covered three days, the first devoted particularly to the inter-relation of constitutional and environmental factors in the causation of bronchitis, the second to pathology and the mechanical factors in airway obstruction, and the third to pharmacology.

To English readers the first section has two intriguing facets—the study of children as indicators of harmful environmental influences other than smoking, and the emphasis on endogenous rather than exogenous causes of bronchitis. In Britain we have been concerned mainly with the study of environmental factors, and it is refreshing to see the amount of work, particularly from Europe, on why a person is unduly sensitive to outside influences rather than to the study of those influences themselves. This approach emphasized the well-known difficulty of separating asthma from bronchitis. Is a high sensitivity to histamine an indicator of the asthmatic rather than the bronchitic? An extensive review of occupational factors and bronchitis by Higgins concluded that occupational exposure to both vegetable and mineral dusts and fumes

contributes but suggested the possibility that, in some cases, allergic sensitization may also be an important mechanism.

The sessions on pathology and mechanical factors in airway obstruction centred round the position of the obstruction, and, taken together, the eight papers in this section form an excellent review of the recent work of pathologists and physiologists in delineating the functional site of the bronchitic lesion.

The final sections on the pharmacology of bronchial obstruction began with useful reviews of pharmacological and reflex factors mediating bronchial obstruction by Brocklehurst and Widdicombe respectively and continued with a detailed paper by Booij-Noord and her colleagues from the Netherlands on provocation tests with allergic and non-allergic stimuli. This, with a paper by Simonsson which followed it, emphasized the complexity of the alpha and beta receptor systems controlling cardiac and bronchial muscle activities and their importance in the development of bronchodilating substances free of cardiovascular side effects.

This volume impinges on many facets of the bronchitis problem and will be found a useful guide to the direction of modern work on it. In this connexion the reference lists after each paper will also be valuable.

C. B. MCKERROW

Sensorineural Hearing Loss. Edited by G. E. W. Wolstenholme and Julie Knight. (Pp. 358; illustrated; £4.) London: Churchill. 1970.

This handsomely produced volume contains a series of important papers which were presented at a recent Ciba Foundation Symposium. As is inevitable with symposia of this character, it is impossible to cover the whole field of sensorineural loss in such a limited space. Those expecting a complete and comprehensive survey of this subject, as might be anticipated from the title of this work, will perhaps be somewhat disappointed.

Rather, indeed, are the organizers to be congratulated on assembling such an excellent cross-section of many aspects of current research concerning the difficult problem of what many of us were brought up to call simply 'nerve deafness'.

The studies range from considerations of the normal structure of the organ of Corti, the pathology of deafness, necropsy findings in sensorineural deafness and possible causes of profound deafness in childhood to detailed descriptions of new and sophisticated audiometric tests, particularly the stapedius reflex test in the differential diagnosis of acoustic tumours, and experimental electrophysiological and scala tympani perfusion techniques in animals.

From a practical point of view, the paper by J. Marquet of Belgium is of particular interest. This studies the disturbing problem of sensorineural hearing loss which may follow surgical procedures on the ear, and discusses both the causation and prevention of this disturbing complication. Any industrial medical officer who is approached for advice concerning the advisability of operative treatment for chronic otitis media, or of stapes surgery for otosclerosis, will find much food for thought in this article.

Especially noteworthy for those concerned with the care of the ear in industry are the contributions by Engström and his associates dealing with noise-induced cochlear damage, and by Burns and Robinson describing an investigation of the effects of occupational noise on hearing.

The former, using the surface preparation techniques which they have pioneered, illustrate their findings both with electron micrographs and with phase-contrast microscopy. Their pictures show with beautiful clarity, for instance, the damage produced in a single outer hair cell in the organ of Corti after six hours' exposure to helicopter noise. The effects of a variety of different sound exposures, including both white and pink noise, jet engine noise, gunshots, and explosions, are described in great detail. Pyknosis and disintegration of hair cell nuclei as a result of intense noise exposure are very clearly depicted. An illustration is also given of yet another increasing everyday problem, ototoxic antibiotics. The extensive disruption of nerve fibres and nerve endings in a cochlea thus damaged is vividly depicted and should surely give everyone pause to think before administering any drug so potentially hazardous.

The work of Burns and Robinson crystallizes the results of many years' research carried out jointly by the Medical Research Council and the National Physical Laboratory. One of the most important concepts which they propound is that of the noise immission level (NIL). This is an index of the total sound energy incident on an ear during a working lifetime. In retrospective studies, correlation between NIL and presumed noise-induced hearing loss has been found in terms of rate of onset and degree of hearing impairment.

To date, as far as the factory doctor is concerned, the almost universal method of ascertaining the degree of any hearing defect has been by the use of pure-tone audiometry. A thoughtful and provocative account of alternatives to threshold measurement in the assessment of hearing is provided by Broadbent and Stephens. Perhaps a pointer to the future is provided in their suggestion that measurement of the detectability of sounds of short duration may provide an alternative method of localizing auditory lesions.

Finally, both editors and publishers are to be congratulated for publishing in full at the end of each paper the discussion which ensued. Frequently this underlines the most salient features of each report and other workers in similar branches of research amplify and clarify the findings of the original writers. This is one of the most valuable features of this commendable publication.

D. L. CHADWICK

Pneumoconiosis: Proceedings of the International Conference, Johannesburg 1969. Edited by H. A. Shapiro. (Pp. 652; illustrated; £11.75.) London: Oxford University Press. 1970.

This conference was attended by some 230 invited experts, of whom 60 were from overseas, mainly from Europe, North America, Australia, and Japan. In view of the increasing problems presented by asbestos in the last decade, it is not surprising that these took pride of place.

Mesothelioma is now recognized as one of the most important and maybe most retractable problems in industrial and environmental health. Reviews of the present situation in a number of countries are reported, but the extent of the problem will be better judged when some current surveys are completed.

It is impossible in a short review to cite the authors quoted, and one must be content with a few examples. It is contended that the source of asbestos bodies, or these bodies by some other name ('ferruginous' is a favourite), in the general population is probably linked to occupational exposure and mainly to the construction industry and that the incidence of neoplasms is higher in cases in whom these bodies are present; in experimental animals they have been shown to occur only with asbestos and glass fibre among the many substances tested. With vegetable and animal dusts, foreign body granulomata and not ferruginous bodies may be produced, but man-made fibres may produce pseudo-asbestos bodies.

Many of the theories presented merit greater or lesser degrees of credulity. Among the former is the hypothesis supported by considerable proof that chrysotile fibres are less respirable because they are curved and, even when broken, cannot descend into the respiratory tree as easily or as deeply as the straighter fibres of other types of asbestos. There is an engaging explanation of the mechanism whereby pleural plaques are formed without adhesions or associated malignancy. It is based on the theory that the fibres formed *in vivo* are short and sharp and easily puncture the soft lung tissue in which their migration is facilitated by the lung movement. They are eventually brought up against the harder tissues of the ribs or tendinous diaphragm where they deposit. The plaque is there derived from fibroblast, and not mesothelial, cells. This would explain why plaques are invariably found on the parietal pleura only and do not progress to mesothelioma.

After the excitement of asbestos, coal worker's pneumoconiosis, silicosis, chronic bronchitis, and vegetable dust might have been expected to be pedestrian, but they are still manifestly world problems, and there are many stimulating papers on these subjects. Once again, the relationship between dust and bronchitis (however defined!) or lung cancer takes up a good deal of space and energy, although cigarette smoking again emerges as much the arch enemy—or whipping boy—as dust. The dangers from occupational and general environmental pollution make one wonder if the section on the engineering hygiene aspects is not possibly the most important part of the volume. Much work remains to be done, but the originator of this platitude could hardly have visualized a survey, now being done in New York, of one million people in which 68 000 (sixty-eight thousand—no misprint) volunteer investigators from the American Cancer Society are participating.

This is a book for those specially interested in the subject, whether their interest be industrial hygiene, clinical medicine, respiratory physiology, or experimental work, and those engaged in these fields cannot afford not to have it. For the general reader it may be too expensive, but it is full of interest. Much of it is lively and much is new, and what is lively and new more than compensates for the inevitable number of dull, pot-boiler papers. A faithful report of the critical discussions following the