

overstated by the inclusion of diagnoses by other pathologists as the tumour in general tends to be underdiagnosed (Newhouse and Wagner, 1969). These authors reviewed the causes of death in a group of workers at an asbestos factory and found 19 mesothelial tumours in 84 cases in which adequate pathological material was available, but of which only four cases had previously been recognized.

The observed incidence of definite mesothelioma in this series was approximately 120 per year. For the reasons stated above this figure may considerably understate the true incidence.

The proportion of mesothelial tumours in which asbestos exposure cannot be implicated has been quoted by Wagner *et al.* (1971) as 10 to 15%. The geographical distribution in the present series showed that in Greater London, where there are substantial asbestos-using industries, 29 (50%) of 58 definite mesotheliomas had no ascertainable occupational asbestos exposure. Overall in the study there were 38 cases (15.0% of all mesothelial tumours) lacking evidence of asbestos exposure.

In this study the briefest occupational exposure to asbestos associated with a mesothelial tumour was three weeks, but if asbestos was a cause of mesothelioma it cannot be assumed that lesser exposures are safe.

Under industrial conditions prevailing in England and Wales and in Scotland the significance of crocidolite in the aetiology of mesothelioma could not be determined.

Planning, administration, and field work were carried out by all the members of the Medical Services Division (now Employment Medical Advisory Service) of the Department of Employment between 1967 and 1971. The assistance of the following is gratefully acknowledged: the Registrars General for England and Wales and Scotland; HM coroners and their officers; hospital records officers and the staff of the Pneumoconiosis Medical Panels who provided information and leads as to further sources of information; the pathologists (including the members of the British panel of UICC pathologists for the standardization of the diagnosis of mesothelial tumours); Dr. K. F. W. Hinson and members of his department at the Brompton Hospital who circulated slides to the panel; Dr. J. C. Gilson, Dr. J. C. Wagner, and other members of the staff of the MRC Pneumoconiosis Unit, Penarth; Professor P. C. Elmes and Professor W. R. Lee who read the draft manuscript and made a number of helpful suggestions; Mr. R. V. Hayball and Mr. M. T. E. Houghton of the Employment Medical Advisory Service for their meticulous record keeping; the late Dr. D. C. Lindars who assisted with the final draft. The following members of the Medical Services Division undertook the laborious yet delicate work of tracing: J. D. Bell, E. S. Blackadder, M. J. Catton, H. J. Davies, T. W. Davies, A. T. Doig, K. J. Dunlop, L. E. Euinton, M. D. Kipling, G. L. Ritchie, G. F. Smith, J. B. L. Tomblinson, D. G. Trott, J. G. S. West, and R. Whitelaw.

References

- Ashcroft, T. and Heppleston, A. G. (1970). Mesothelioma and asbestos on Tyneside—a pathological and social study. In *Proceedings of the International Conference on Pneumoconiosis, Johannesburg, 1969*, edited by H. A. Shapiro, pp. 177-179. Oxford University Press, Cape Town.
- (1973). The optical and electron microscopic determination of pulmonary asbestos fibre concentration and its relation to the human pathological reaction. *Journal of Clinical Pathology*, 26, 224-234.
- Cameron, J. M., Litton, A., and Lyon, D. S. (1961). Primary carcinoma multiplex. *Journal of Clinical Pathology*, 14, 574-577.
- Hammond, E. C. (1966). Smoking in relation to the death rates of one million men and women. In *Epidemiological Approaches to the Study of Cancer and Other Chronic Diseases*, edited by W. Haenszel, p. 127. National Cancer Institute Monograph, No. 19. National Cancer Institute, Bethesda, Maryland, U.S.A.
- Hourihane, D. O'B. (1964). The pathology of mesothelioma and an analysis of their association with asbestos exposure. *Thorax*, 19, 268-278.
- Lloyd Davies, T. A. (1970). *Annual Report of H.M. Chief Inspector of Factories 1969*, p. 57, Cmnd 4461. H.M.S.O., London.
- McCaughy, W. T. E. (1965). Criteria for diagnosis of diffuse mesothelial tumours. *Annals of the New York Academy of Sciences*, 132, 603-613.
- and Oldham, P. D. (1974). Diffuse mesotheliomas: morbid anatomical and histological criteria, including observer variation in histological diagnosis. *Proceedings of the Working Group to review the Biological Effects of Asbestos*. International Agency for Research on Cancer, W.H.O., Lyon (in press).
- McEwen, J., Finlayson, A., Mair, A., and Gibson, A. A. M. (1970). Mesothelioma in Scotland. *British Medical Journal*, 4, 375-378.
- Newhouse, Muriel L., Berry, G., Wagner, J. C., and Turok, Mary, E. (1972). A study of the mortality of female asbestos workers. *British Journal of Industrial Medicine*, 29, 134-141.
- , and Wagner, J. C. (1969). Validation of death certificates in asbestos workers. *British Journal of Industrial Medicine*, 26, 302-307.
- Registrar General (1970). *Statistical Review of England and Wales for the Year 1968, Part I, Medical*, p. 124. H.M.S.O., London.
- Rous, V. and Studeny, J. (1970). Aetiology of pleural plaques. *Thorax*, 25, 270-284.
- Selikoff, I. J., Hammond, E. C., and Churg, J. (1970). Mortality experience of asbestos insulation workers. In *Proceedings of the International Conference on Pneumoconiosis, Johannesburg (1969)*, edited by H. A. Shapiro, pp. 180-186. Oxford University Press, Cape Town.
- Senior Medical Inspector's Advisory Panel Memorandum (1968). *Problems arising from the Use of Asbestos*. H.M.S.O., London.
- Smither, W. J., Gilson, J. C., and Wagner, J. C. (1962). Mesotheliomas and asbestos dust (letter). *British Medical Journal*, 2, 1194-1195.
- Thomson, J. G. (1970). The pathological diagnosis of malignant mesothelioma of the pleura and peritoneum. In *Proceedings of the International Conference on Pneumoconiosis, Johannesburg (1969)*, edited by H. A. Shapiro, pp. 150-154. Oxford University Press, Cape Town.
- Wagner, J. C., Gilson, J. C., Berry, M. A., and Timbrell, V. (1971). Epidemiology of asbestos cancers. *British Medical Bulletin*, 27, 71-76.
- , Munday, D. E., and Harington, J. S. (1962). Histological demonstration of hyaluronic acid in pleural