

to ensure that it is the doctor in charge should be responsible direct to the hospital management committee, board of management, or board of governors. Further, to provide expert advice in occupational health, the report recommends the appointment of a senior doctor from industry or a university department to the regional hospital board.

In general this report will be welcomed, and especially its emphasis on trying out different schemes, for what may seem to a tidy mind to be haphazard arrangements have often grown up to suit the requirements of a particular hospital and its staff, and in doing so may be more humane and effective than one that is universal and official. In any plans to develop a new service, however, the arrangements at present in force will need to be borne in mind, for the position of those running them must be safeguarded.

Writing on accommodation of staff, which certainly has a bearing on health and hygiene, the committee noted from personal visits that some of it was "appalling" and did not indeed reach the minimum standards laid down by Acts of Parliament. This sort of thing was not even unusual, but "widespread." As the hospital service employs more than half a million people, of whom 75% are women, the committee's strictures on working and living conditions deserve the urgent attention of the departments of health. Much could be done to remedy them long before a full occupational health service is established. Meanwhile experimental schemes, of which several have been started, to provide a health service for hospital staffs will be studied with interest.

Herpes Encephalitis

Herpes simplex virus was first isolated in 1941 from the brain of a 4-week-old infant who died after an acute encephalitis.¹ During the next 20 years it was identified in several cases of neurological disease varying from aseptic meningitis² to acute encephalitis.^{3,4} The total number of cases reported was small, and it did not appear that herpes contributed much to the total number of non-bacterial infections of the central nervous system.

This is still probably true today in respect of herpes as a cause of aseptic meningitis. Perhaps 1% or fewer cases can be attributed to herpes.⁵ But it is now known to cause a considerable number of severe infections of the central nervous system, such as acute necrotizing encephalitis. This type of encephalitis, first reported by Van Bogaert and his colleagues⁶ and associated with intense neuronal necrosis, is being identified with increasing frequency.⁷ Herpetic encephalitis is by no means so rare as it was generally assumed to be, but because of its sporadic occurrence and mode of presentation the cause may be overlooked.

Patients usually present with an acute febrile illness with headache, confusion, and convulsions. There may be clinical and radiological evidence of an expanding lesion in the brain, particularly in the temporal lobes, so that distinction from an abscess or tumour is important. The need for early and accurate diagnosis is further emphasized by the fact that specific treatment with the antiviral compound idoxuridine, if it is to have much chance of success, should be administered as early as possible before the neuronal necrosis has progressed too far.

Herpes encephalitis occurs as an acute and sporadic illness in any age group, but there are differences between the disease

in infants and in older children and adults. In infants the central nervous system is usually attacked as part of a disseminated infection, often involving the liver and adrenals, and frequently the skin too. Massive haemorrhagic necrosis, with softening of many parts of the brain, perivascular cuffing, and intranuclear inclusions, is found at necropsy.

W. Haymaker and his colleagues⁸ reviewed 42 cases of herpetic encephalitis, of which seven were of the infantile type. In the remaining 38 adults the illness was confined to the nervous system. The onset was acute, with headache, fever, nausea and vomiting, confusion, loss of memory, and profound agitation. The average length of the illness was ten days, but one patient survived four years. The gross changes at necropsy were softening with haemorrhagic necrosis of grey and white matter. A more recent review by W. Leider and his co-workers⁹ from California of 18 cases of herpes simplex infection of the central nervous system included 15 cases of encephalitis. Five of these were infants and young children and the remainder were adults aged 17 to 71 years. Of interest is the fact that of the ten adult patients only one died, three remained in hospital, three had permanent loss of memory or behavioural disorder, and five were normal on discharge. In three of these adult patients a history was obtained of previous recurrent labial herpes, and all three had complement-fixing antibody in serum taken within four to seven days of the onset of the encephalitic illness. These and some of the others showed a rise in C.F. antibody, and though the C.F. test is less reliable than the neutralization test in diagnosis of infections, because of cross-reactions between herpes and varicella-zoster viruses,¹⁰ it seems probable that several of these cases resulted from reactivation of latent virus. Others are probably due to primary infection.

Many other cases have been reported in the past seven years from Great Britain and abroad, nearly all of which fit the diagnosis of acute necrotizing encephalitis. Diagnosis during life is extremely difficult, even if it is suspected, unless specific virological tests are employed. F. O. MacCallum and his colleagues¹¹ reported two cases presenting as a brain abscess in which the definitive diagnosis was made by isolation of the virus from cortical biopsies in human amnion cell cultures. J. H. Adams and W. B. Jennett¹² have reported

¹ Smith, M. G., Lennette, E. H., and Reames, H. R., *Amer. J. Path.*, 1941, 17, 55.

² Armstrong, C., *Publ. Hlth Rep. (Wash.)*, 1943, 58, 16.

³ Whitman, L., Wall, M. J., and Warren, J., *J. Amer. med. Ass.*, 1946, 131, 1408.

⁴ Zarafonitis, C. J. D., Smadel, J. E., Adams, J. W., and Haymaker, W., *Amer. J. Path.*, 1944, 20, 429.

⁵ Macrae, A. D., in *Virus Meningo-encephalitis*, Ciba Foundation Study Group No. 7, p. 6, ed. G. E. W. Wolstenholme and M. P. Cameron. 1961. London.

⁶ Van Bogaert, L., Radermecker, J., and Devos, J., *Rev. neurol.*, 1955, 92, 329.

⁷ *Brit. med. J.*, 1966, 1, 1497.

⁸ Haymaker, W., Smith, M. G., van Bogaert, L., and de Chenar, C., in *Symposium on Viral Encephalitis*, p. 95, ed. W. S. Fields and R. J. Blattner. 1958. Springfield, Ill.

⁹ Leider, W., Magoffin, R. L., Lennette, E. H., and Leonards, L. N. R., *New Engl. J. Med.*, 1965, 273, 341.

¹⁰ Ross, C. A. C., Sharpe, J. H. S., and Ferry, P., *Lancet*, 1965, 2, 708.

¹¹ MacCallum, F. O., Potter, J. M., and Edwards, D. H., *Lancet*, 1964, 2, 332.

¹² Adams, J. H., and Jennett, W. B., *J. Neurol. Neurosurg. Psychiat.*, 1967, 30, 248.

¹³ Harland, W. A., Adams, J. H., and McSeveney, D., *Lancet*, 1967, 2, 581.

¹⁴ Breeden, C. J., Hall, T. C., and Tyler, H. R., *Ann. intern. Med.*, 1966, 65, 1050.

¹⁵ Evans, A. D., Gray, O. P., Miller, M. H., Jones, E. R. V., Weeks, R. D., and Wells, C. E. C., *Brit. med. J.*, 1967, 2, 407.

¹⁶ Marshall, W. J. S., *Lancet*, 1967, 2, 579.

¹⁷ Buckley, T. F., and MacCallum, F. O., *Brit. med. J.*, 1967, 2, 419.

¹⁸ Olson, L. C., Buescher, E. L., Arstenstein, M. S., and Parkman, P. D., *New Engl. J. Med.*, 1967, 277, 1271.

¹⁹ Blackwood, W., Dudgeon, J. A., Newns, G. H., and Phillips, B. M., *Brit. med. J.*, 1966, 1, 1519.

on eight cases admitted to a neurosurgical unit because an expanding intracranial lesion was suspected. Six of the patients died and one was left with a severe behavioural disorder. The spinal fluid was abnormal in all cases, but neither electroencephalography nor contrast radiology were of much diagnostic value other than to confirm that an intracranial lesion was present. Definitive diagnosis was made by histological examination in four cases and by isolation of virus in a further case.

Two other methods can be used in the rapid diagnosis of herpes simplex infection—immunofluorescence and electron-microscopy. Both are useful examinations to carry out on biopsy specimens. This is particularly true of electron-microscopy. W. A. Harland and his colleagues¹³ have recently reported fatal cases of herpes necrotizing encephalitis in which virus particles of the herpes virus type were found in six fatal cases and in one case treated by idoxuridine.

Treatment of an established herpes encephalitis is either by surgical decompression or by chemotherapy. It has been shown that idoxuridine inhibits the action of D.N.A. viruses, such as herpes and vaccinia. C. J. Breeden and his colleagues¹⁴ have reported a case of herpes encephalitis treated by surgical decompression and intravenous therapy with idoxuridine for seven days. The patient made a moderately good recovery. Of three other cases given idoxuridine two showed some improvement,^{15 16} and intravenous therapy may have limited the spread of virus in the third.¹⁷ To evaluate the effect of idoxuridine or any other such compound in these cases is difficult, because, despite the high mortality rate in herpes simplex, patients may recover without treatment.^{9 18}

There is little doubt that some cases result from reactivation of latent virus. But where does it lurk between primary infection and reactivation? Most of the patients so far reported on have had acute illnesses, but in at least two cases^{12 19} virus was recovered from the brain 8 and 13 weeks after the onset of the neurological illness. Whether herpes virus can produce a chronic encephalitis in man, as can be produced experimentally in animals, has yet to be determined. This and other problems relating to the latency of herpes simplex call for further study.

Operation for Angina Pectoris

Surgeons have devised many operations to provide a flow of arterial blood to ischaemic myocardium, but the only one to have stood the test of time is the most improbable of them all—the implantation of an internal mammary artery, originally performed by A. Vineberg in 1950.¹ An internal mammary artery, dissected from the chest wall and implanted with bleeding side holes into the wall of the left ventricle, surprisingly neither undergoes thrombosis nor causes a large intramural haematoma but establishes vascular connexions with the coronary circulation. These connexions reach some size by about six weeks and their maximum at about six

months.² The operation never became popular, because of the difficulties of correlating relief of angina with any specific surgical intervention, but the development of coronary arteriography by Mason Sones at the Cleveland Clinic³ has revived interest in it by showing in living patients that an implanted internal mammary artery does indeed restore the vascular function of coronary arteries distal to an arteriosclerotic occlusion. Angiographic evidence of perfusion of a blocked coronary artery is not necessarily the same as oxygenation of the myocardium, but R. Gorlin² has shown by special techniques that the myocardium is in fact perfused from the internal mammary artery and that its metabolism usually reverts from an anaerobic to an aerobic pattern.

The investigatory tests, the indications for operation, its technical details, and its results have now therefore become of real clinical importance. Donald Effler and his colleagues, for instance, have already performed 2,000 Vineberg operations at the Cleveland Clinic.⁴ Coronary arteriography is first undertaken to determine whether the patient's angina is due to myocardial ischaemia, and it delineates the extent of the coronary arterial occlusive disease. Left ventricular angiography provides evidence of the contractility of the myocardium.^{2 4 5}

The indications for recommending the Vineberg operation vary from one cardiac centre to another, but the chief one is severe angina in a patient who has one or more coronary arteries narrowed to at least 25% of their normal lumen, particularly if he is young or has a strong family history of myocardial infarction. Cardiac failure is the main contra-indication, because it is not improved by internal mammary implantation. Failure is judged by cardiac enlargement, a markedly raised end-diastolic pressure in the left ventricle, or evidence of poor myocardial contractility as seen by angiography. Other contraindications are status anginosus (unprovoked angina), extensive arteriosclerosis elsewhere, and left ventricular aneurysm, but a previous myocardial infarct does not preclude operation, because there must be live muscle to produce angina.

Results of the Vineberg operation may be assessed by operative mortality, relief of angina, and increased longevity. By careful selection of patients and implantation of one or both internal mammary arteries into demonstrably ischaemic but still contracting parts of the left ventricle the operative mortality has been reduced to approximately 5%, and the graft remains patent in 80% of the survivors. Clinical improvement is closely related to patency of the graft, and complete or partial relief of angina is also achieved in some 80% of the survivors.^{2 4-6} Increased longevity or prevention of subsequent infarction cannot yet be claimed for the operation with any certainty, though it is becoming apparent with increasing length of follow-up that patients with a patent internal mammary implant seem to have a better chance of survival than those with an occluded implant or than comparable patients who have not had an operation at all.^{2 5}

The Vineberg operation of internal mammary artery implantation is no longer an experimental procedure but is becoming an accepted surgical operation with well-defined indications, contraindications, operative technique, and results. There is little doubt that it will soon be part of the surgical armamentarium of every cardiac centre.

On 27 July Sir John Peel was re-elected president of the Royal College of Obstetricians and Gynaecologists.

¹ Vineberg, A., *Canad. med. Ass. J.*, 1951, **64**, 204.

² Gorlin, R., *Bull. N.Y. Acad. Med.*, in press.

³ Sones, F. M., and Shirey, E. K., *Mod. Conc. cardiov. Dis.*, 1962, **31**, 735.

⁴ Effler, D. B., 1968, unpublished data.

⁵ Bigelow, W. G., Moynihan Lecture, Royal College of Surgeons, 1968, in press.

⁶ Aldridge, H. E., MacGregor, D. C., Lansdown, E. L., and Bigelow, W. G., *Canad. med. Ass. J.*, 1968, **98**, 194.