

of early cervical cancer prevent deaths from this disease? D. A. Boyes and colleagues⁶ reported a fall in the incidence of invasive cancer of the cervix from 28.4 to 19.7 per 100,000 in British Columbia after a large-scale screening programme, but the eradication of the disease as a cause of death remains a pipe-dream at present owing to the difficulties of applying on a mass scale a series of technical procedures that demand considerable skill. Especially to be noted too are the differences in malignancy of cervical cancers, as of all other cancers. Probably not all cervical cancers go through a detectable stage of preinvasion, some preinvasive cancers may regress, and some are incurable with present methods whatever the stage at which the cancer is detected. This is not counsel of despair nor does it lead to diagnostic and therapeutic nihilism. It is a recognition that miracles are unlikely, and Jeffcoate has done yet another service by drawing attention again to the inadequacies of a programme devoted only to cervical cytology. His article is a call to examine more of the patient than her cervix.

Perseveration

The term "perseveration" is best defined as the "continuation or recurrence of an experience or activity without the appropriate stimulus," though it has been used with other meanings. As Dr. R. S. Allison points out in his two Croonian lectures published in this and last week's issues of the *B.M.J.*, it may be an important sign of disease in the nervous system.

The unnecessary repetition of a given movement is sometimes called motor perseveration, while inability to relax a part of the body after the performance of a movement has been called tonic perseveration. A physiological definition given by H. H. Jasper¹ is also helpful. He suggested that perseveration implied "the tendency of a set of neurones once excited to persist in the state of excitement autonomously, showing resistance to any change in this state." Clinically, perseveration implies the continuation or repetition of a purposeful response which is entirely appropriate to the first of two stimuli but is inappropriate to a second stimulus which is nevertheless essential to provoke it. As Allison points out, it is only when a second stimulus, to which a very different response would be expected, results in a recurrence of the response to the first one that we can say plainly that perseveration exists. The phenomenon is involuntary in the sense that the patient cannot check or prevent it. Clinical tests include the eyes-tongue, tongue-eyes test, in which the patient is asked first to shut his eyes tightly and then to put out his tongue. Perseveration is plainly present when, after responding correctly to the first request, the patient in response to the second either closes his eyes again and fails to put out his tongue, or puts out his tongue and closes his eyes simultaneously. Tests of serial drawing of different shapes, searching for hidden objects, counting aloud, naming the days of the week, repeating the names of towns or cities, or writing to dictation are also useful. Thus, in writing, the patient may repeat a part or the whole of certain words.

Though perseveration was first defined as a symptom of diffuse or focal brain disease, it may occur naturally in healthy people. It is commonest in childhood, relatively infrequent in adult life, but again more frequent in old age.²

Attempts to determine whether perseveration in normal people can be related to personality have been on the whole unsuccessful, though H. J. Eysenck³ considers that there may be a relationship between some perseveratory phenomena and certain personality traits. The more complex the stimulus and its required response, the more likely is perseveration to occur, while it is also commoner when stimuli are applied at short but regular intervals. Tension, anxiety, and fatigue also increase its incidence, perhaps because the subject fails to grasp sufficient details of the first stimulus to enable him to perceive that the second one is different.

Allison records that for the past 15 years he has been searching as a routine for perseveration in a wide variety of organic brain conditions, ranging from acute and chronic diffuse afflictions to focal lesions, whether due to a tumour or to vascular disease. It is not common in neurotic patients, though other workers have found it to be a common feature of certain psychoses. Allison finds that it most often occurs in states of disturbed consciousness, and may pass unnoticed when there are other more obvious symptoms. It may complicate the phase of disorientation that follows head injury and is common during recovery from carbon-monoxide poisoning. It may also accompany early intellectual deterioration in presenile dementia and cerebral atherosclerosis, while in cases of acute or subacute vascular and neoplastic lesions in either cerebral hemisphere it usually indicates increasing cerebral oedema. Metabolic disorders, including cerebral anoxia, drug intoxication, electrolyte imbalance, hypoglycaemia, and hepatic encephalopathy may all produce it. Allison stresses that inexperienced doctors and nurses usually have no difficulty in recognizing profound clouding of consciousness but can easily be misled into mistaking the incongruous behaviour of perseveration for hysteria.

The perseveration itself can rarely, if ever, be used as a localizing sign of a focal brain lesion. Some of the peculiar disorders of movement which result from damage to the frontal lobes are allied to perseveration and may represent a motor manifestation of it. Perhaps involuntary grasping and groping may be so regarded. However, it seems that perseveration is rarely the result of a unilateral frontal lesion and it almost always implies bilateral brain damage. By contrast, it is not uncommon in lesions of the parietal lobes. Here the patient may feel repeated contacts or sensory stimuli when there are none, while the visual after-images which are sometimes noted in patients with lesions of the parieto-occipital region may also be regarded as perseveratory phenomena. Perseveration in speech is of doubtful import. Occasionally a patient's speech is contaminated "by words which he has already used but cannot get rid of."⁴ But most writers on aphasia conclude that perseveration in speech is not a part of aphasia and is generally due to associated confusion rather than to the lesion causing the speech disorder. Nevertheless, Allison, after looking carefully for it in 24 patients with dysphasia, found that it was observed repeatedly in 16 of them, and that it might persist for weeks, months, or even for years. None of the 16 patients perseverated on each and all of the tests given, and all but five did so only in activities requiring a special use of speech and language. There was a striking relationship between perseveration and the absence of spontaneous talk in 13 out of 16 patients, and Allison concluded that there seems to be

¹ Jasper, H. H., *J. soc. Psychol.*, 1931, 2, 28.

² Cattell, R. B., *J. ment. Sci.*, 1935, 81, 151.

³ Eysenck, H. J., *The Structure of Human Personality*, 1953. London.

⁴ Brain, W. R., *Brain*, 1961, 84, 145.

a link between perseveration on the one hand and either imperfect comprehension of a stimulus or an imperfect response to it on the other. When an avenue of escape like circumlocution or paraphrasis was available the incidence of perseveration fell, whereas it tended to persist in patients whose only means of supplementing their defective speech was through the inadequate means of gesture and pantomime. Its incidence was also increased by emotional tension and anxiety.

Clearly, therefore, perseveration of motor and sensory activity and perhaps of speech can usually be regarded as an important sign of diffuse brain disease or dysfunction, except in the very young or in the elderly. Its significance as a sign of focal brain disease is much less certain, but Allison's careful observations have clarified the steps which will now be necessary to determine whether this phenomenon can ever be used as an indicator of a focal cerebral lesion.

Cardiac Pain

In the diagnosis of angina pectoris the history is all-important. The classical characteristics of the pain are too well known to warrant repetition. They were described almost two hundred years ago by William Heberden,¹ and most patients have pain which conforms closely to his description.

But the classical pattern has many variations, though their frequency is uncertain. Pain may radiate to the front or back of the neck, to the jaw, shoulder, arms, or back, or it may be felt only in these areas. The patient's description of its quality can confuse the doctor, and while the pain usually lasts less than ten minutes its duration can occasionally exceed fifteen to thirty minutes. It is sometimes brought on only by emotional states or in recumbency or at night and not during exertion, though this is unusual.

In diagnosis attention should be paid to the location, radiation, quality, duration, and intensity of the pain, but of more importance than any of these is its response to factors which precipitate or relieve it. This is confirmed in a study of a group of patients experiencing pain in the chest after recovery from myocardial infarction carried out by Dr. A. Verghese and Professor R. R. H. Lovell and reported at page 1102 this week. They comment that few cases of ischaemic heart pain will be missed if the precise questions formulated for epidemiological use by G. A. Rose² on the relation of pain to effort are used, provided the criteria for site and duration are not too restrictive. They also found that one-quarter of their patients with angina pectoris were able to recognize more than one type of pain, and they rightly indicate how necessary it is for doctors to be aware of the frequency with which multiple pains can occur, since these can be confusing for both patient and physician.

The diagnosis of myocardial infarction is in general a simpler matter, particularly since objective confirmatory evidence from electrocardiograph or laboratory is usually available. The pain of infarction has the same constricting quality as that of angina pectoris, but is as a rule more intense and tends to last considerably longer. Its location and radiation are similar to those of angina pectoris, though it may occur at any time. Often the patient with previous experience of angina pectoris can tell that this is a new and different pain despite the similarities of the pains in the two conditions. But a few patients undergo myocardial infarction without

experiencing any pain. They may then present with left ventricular failure, syncope, general malaise, congestive cardiac failure, an arrhythmia, or a cerebrovascular accident. Occasionally electrocardiographic evidence of infarction is discovered in the complete absence of any history of symptoms. Apparently painless infarction may occur while patients are under anaesthesia or after operation.

Among conditions which may mimic myocardial infarction are acute pericarditis, massive pulmonary embolism, dissecting aneurysm, cardiac arrhythmias, spontaneous pneumothorax, spontaneous rupture of the oesophagus, and acute abdominal conditions such as pancreatitis and perforated peptic ulcer. The character, location, and distribution of the pain in many of these conditions may be very similar. Since they occur spontaneously, there is no assistance to the physician from provoking or relieving factors, so that the examination and investigations are likely to be at least as important as the history. Suggestive features which may be found on physical examination include deep venous thrombosis in the legs, absent pulses, abnormalities of the cardiac rate and rhythm, and characteristic signs in the lungs or the abdomen. Distinctive electrocardiographic changes are likely to be found in acute pericarditis, massive pulmonary embolism, and arrhythmias and will aid their differentiation from myocardial infarction. These conditions may also occur as complications of acute myocardial infarction, and diagnosis is then likely to be more difficult, though they must each be considered before recurrent chest pain is attributed to further myocardial infarction.

Chest pain may also be due to the post-myocardial infarction syndrome,³ thought to be due to an autoimmune response to injured heart muscle and similar to the syndrome which sometimes follows cardiac operations. Pericardial pain is usually accompanied by fever and a tendency to relapse. The condition occurs most frequently two to six weeks after the infarct, but may come on months later. A pericardial friction rub is often present, with electrocardiographic changes of pericarditis and radiological evidence of pericardial effusion, but confirmation of the diagnosis depends on the dramatic response to steroids (frequently with relapse when these are withdrawn).

Occasionally patients may obtain relief from angina pectoris by an attack of myocardial infarction, but it is more common for angina to occur for the first time after an infarct. Patients may also notice other types of pain after infarction, and Verghese and Lovell found that over half of those followed up for three years after an infarct were subject to chest pain. Angina pectoris accounted for the pain in two-thirds of these, but ten patients (9.4% of the total group) complained of left chest pain which did not satisfy the criteria for angina. A similar incidence of left chest pain after infarction has been noted by other authors.⁴ The aetiology of this pain is uncertain, but Verghese and Lovell comment that it often seems to upset patients more than angina pectoris, and they consider that it in many ways resembles the pain of Da Costa's syndrome. They propose to discuss this pain further in a later paper.

Patients may also develop persistent pain in the shoulder and hand after myocardial infarction. The shoulder may

¹ Heberden, W., *Med. Trans.* (College of Physicians, London), 1772, 2, 59.

² Rose, G. A., *Bull. Wld Hlth Org.*, 1962, 27, 645.

³ Dressler, W., *Arch. intern. Med.*, 1959, 103, 28.

⁴ Edwards, W. L. J., *Amer. Heart J.*, 1955, 49, 713.

⁵ Ernestine, A. C., and KineH, J., *Arch. intern. Med.*, 1940, 66, 800.

⁶ Johnson, A. C., *Ann. intern. Med.*, 1943, 19, 433.