

EDITORIAL

London, January 1949

The subject of poliomyelitis is one of ever-green interest, for no large civilized community can foretell the attack rates of the next warm months. Our contributors to this issue cover many aspects of the infection and its crippling residua, and our readers will have no difficulty in realizing the importance of team work when a community is faced with a true epidemic. Seddon speaking recently in America has emphasized this need, basing his remarks on personal experience in Malta and Mauritius. Every community, and in particular those island or isolated communities who have paid no insurance in the form of endemic levies, should be able to assemble without delay such a team, headed by a leader given considerable administrative power for the time being.

The social and economic disturbance caused by outbreaks is often out of all proportion to their severity. It is difficult to explain even to an educated population in an endemic area the widespread nature of abortive attacks, the low percentage of significant paralysis and the ineffectiveness of general measures of the type used to control other epidemic diseases. New Zealand is an example in point; every few years a rise in the rate of endemic infection causes an alarm which affects nearly all families through a disturbance of education, travel and leisure, with repercussions in industry and agriculture.

In England there are signs of a calmer attitude justified in view of the relative futility of measures of control of endemic infections. A recent small outbreak at Harrow School may be cited as an example. A score of boys had suffered an obscure acute infection like influenza when one developed some typical cranial nerve palsies and another paralysis of both deltoids. Immediate notification of all parents followed and two boys out of 600 went home. This number later rose to a dozen, mainly on grounds of possible interference with family holidays by quarantine periods. The outbreak ended with a further mild case.

These community outbreaks raise interesting administrative problems. No worker is more qualified to speak than Sabin the great American

epidemiologist, and even he prefers to use the form 'It is therefore reasonable to do so-and-so.' One important piece of advice is derived from the careful clinical studies of Ritchie Russell. He has confirmed a previous suspicion that strenuous or unusual exercise during the pre-paralytic phase might determine the onset of severe or even fatal paralysis. 'It is therefore reasonable' to forbid cross-country running, inter-house competitions and the like as soon as a case is suspected in a school.

Facilities for artificial respiration should be constantly available and in good repair in all communities. The doctors who accompanied the British swimming team to Nice last year will not forget the difficulties which arose when one of the most brilliant members developed a fulminating attack. In this issue Philip Bayer refers to the South African type of iron lung with its large ports and windows giving ease of manipulation and visual control. One of these machines was shipped to St. Helena from Cape Town without special request as soon as news of the epidemic there was received. It was successful for a woman who was delivered of a live premature infant on the second day of paralysis; the accoucheur had reason to be grateful for the modifications mentioned. A serious defect which developed in this particular machine was due to perishing of the rubber bellows, and the need for servicing, especially in hot climates, should be constantly borne in mind.

On the clinical side there are steady developments. It has always been difficult to know when to abandon hope of a paralysed muscle, though a useful guide has come from the work of Harry and many others that '*If a patient has had careful treatment for six months from the infection with no sign of return of voluntary power it is most unlikely that the muscle will regain any useful function.*' The careful electro-myographic studies of superficial muscles carried out by Mackenzie at Oxford not only confirm this, but show that permanent paralysis can be foretold as early as four to six weeks after the onset; axonal regeneration does

not occur if the reaction of degeneration is obtained. It is probable that such careful testing may lead to the early abandonment of useless physiotherapy and advance the commencement of orthopaedic programmes and rehabilitation.

For grossly paralysed patients in Great Britain, the free provision of appliances up to the extent of motor chairs is a welcome benefit under the new health service. The electric and petrol-driven chairs that are being supplied both show great ingenuity of design, while the modified controls of certain standard makes of motor cars are as useful for lesser degrees of paralysis as they are for amputees.

The orthopaedic surgery of poliomyelitis has gained from the advances made in traumatic and neurosurgery during the war, particularly with respect to the upper limb. There is little difference between the biceps shot away and the biceps paralysed; both can be replaced most effectively by Clark's transplant of the lower part of the Pectoralis Major. At the wrist, paralysis simulating musculo-spiral nerve paralysis can be dealt with on the lines indicated by Zachary from his experience of neurosurgery at Oxford. Again opposition of the thumb may be restored by procedures devised by Bunnell and his associates for the varied surgery of the hand. The accuracy of reconstructive surgery owes much to improved records of muscle power using the M.R.C. grades of 0 to 5.

The quality of external splintage has also greatly improved, as those who read Capener's article in this issue will soon realize; the pioneer work of Herschel and Scales at Stanmore in the use of all kinds of plastic material is again outstanding.

Though measures for controlling the incidence of the disease remain largely ineffectual, the intensity of the field and laboratory work being done throughout the world must in time yield heavily, while the treatment of the crippling sequelae of the disease by physiotherapy, rehabilitation and surgery shows continued progress.

K.I.N.

Anterior poliomyelitis is an acute infectious disease caused by a filterable virus, occurring sporadically and in epidemics, and characterized

by varying degrees of injury and degeneration of the central nervous system, particularly affecting the anterior horn cells and the motor nuclei of the medulla. Clinically it shows a diversity of symptoms ranging from the mildest malaise to complete flaccid paralysis of many groups of muscles, with possible death from involvement of the vital centres in the medulla.

The earliest traces of the disease have been found in Egypt. A skeleton dating from approximately 3700 B.C. shows the bones of one leg to be shorter and smaller than those of the other, whilst an engraving of the 18th dynasty (1580-1350 B.C.) shows a priest of the temple of Astarte with a withered leg (Carlsberg Glyptothek, Copenhagen). Hippocrates and Galen both mention epidemics of paralysis occurring in autumn and winter. The first definite account of the disease, however, is that of Underwood (*Treatise on the Diseases of Children*, London, 1784), whilst the first description of an epidemic is that of Badham (*Workshop*, 1835). In 1836 Sir Charles Bell, first professor of surgery at University College Hospital, made the following note:—'A lady whose husband was the English clergyman at St. Helena consulted me about her child who had one leg much wasted in its growth. In conversing about the illness which preceded this affection she mentioned that an epidemic fever spread among all the children in the island three or four years previously, and her child was ill with the same fever. It was afterwards discovered that all the children who had the fever were similarly affected with a want of growth in some part of the body. This deserves to be enquired into.' We are privileged in this present number therefore to report possibly the second epidemic of poliomyelitis in St. Helena.

The definitive work on the disease was published by Heine, an orthopaedic surgeon of Cannstatt, Germany, in 1840. After much careful study of the disease he wrote a further work in 1860 in which he pointed to the spinal cord as the seat of the disease which he named 'infantile spinal paralysis.' As a result, during the following decade attention was turned to the condition of the spinal cord in fatal cases, and the term 'acute anterior poliomyelitis' was introduced by Kussmaul to conform with the pathology. *Medin,*

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proportion of those infected show symptoms of infection and are recognized. To quote Molner (1948). 'The only significant statement which a person can make as far as prophylaxis of poliomyelitis is concerned is that up to this time nothing has been found to be effective, and the only encouraging statement which can be made is that clinical and research efforts are ever expanding in the hope of finding some effective ways and means through which preventive measures may be exercised.'

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writing in the closing years of last century, described the epidemic nature of the disease. Such was the influence of these two that it became known as the Heine-Medin disease.

In 1909 Landsteiner and Popper successfully transferred the disease to rhesus monkeys by intraperitoneal injection from a fatal human case. Intracerebral injection was soon found to be equally effective, whilst filtration through the finest porcelain filter failed to prevent the passage of the causative agent. In 1913 Flexner and Noguchi described the globoid bodies which were only shown to be incidental in the disease after much study in 1936. Rosenow persisted in his streptococcal theory. Experimental work was greatly handicapped by the necessity for using monkeys. Much enthusiasm was therefore shown when Armstrong in 1939 succeeded in transferring the Lansing strain of the virus to the cotton rat and thence to white mice. This and a number of other strains have been isolated from cases occurring in different parts of the world and have been shown to have different characteristics.

More recently the virus has been obtained in fairly pure form by ultra-centrifugation. It has been cultured with difficulty, the greatest success being obtained on media containing living nervous tissues using tissue culture methods, emphasizing the neurotropic property of the virus. By electron microscopy it has been shown to be filamentous in nature and to have a particle size from 10-25 μ . It is thought to contain nucleoprotein but its chemical analysis is still far from complete.

The need for research into the cause and method of spread of this scourge has been recognized in the United States in the National Foundation for Infantile Paralysis (see page 18). Inspired by the dynamic personality of President Roosevelt and generously supported by public subscription, this foundation has instigated and financed an enormous amount of research in all branches of the subject. Not least of its benefactions is the publication of a monthly summary of world literature on the subject. We pray that the labours of these and other workers will be rewarded.