surgical waiting lists should be abolished and that patients should undergo detailed assessment in the outpatient department before booking their admissions for elective operations.

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**References**


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**Medical History**

**Conquest of General Paralysis**

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It is just 50 years since the malarial treatment of general paralysis was introduced into Great Britain, and for the first time some cases of this dreadful disease were cured. General paralysis of the insane, or G.P.I., as it was commonly called, was one of the scourges of Victorian and Edwardian society, and the number of deaths from it each year was registered in thousands. Its syphilitic origin, though previously suspected by many "alienists," was not definitely established until the introduction of the Wassermann reaction in 1906. Mott, writing in 1910, regarded general paralysis as "parasyphilitic," meaning that while syphilis was an essential factor in its causation there must be other factors, since only a small proportion (3-5%) of persons primarily infected developed this disease.

G.P.I. affected men much more than women, and as it came on as a rule between 12 and 20 years after infection it often affected men of high intelligence and vigour when they had attained positions of responsibility and possibly eminence. Its incidence had begun to decline well before the first world war, and the Registrar General's reports, which excluded deaths in the armed Forces, showed a further steep decline during the war years (Fig. 1). Many men who were potential cases of general paralysis must have been killed in the Army, Navy, and the small air force of those days. After the war the continuing decline in the incidence of the disease may be attributed to several factors—(a) the improvement in the treatment of primary syphilis as a result of the introduction of salvarsan and its derivatives, (b) the establishment of local authority clinics for the treatment of venereal diseases, and (c) the improvement in general hygiene, reduction of syphilis in the general population, and the greater availability of contraceptives.

The individual case of G.P.I., however, remained incurable. While occasional remissions were well-recognized, the disease was invariably fatal, the usual duration being two to three years.

**Fever Treatment**

It was not until 1922 that it became known in Britain that in 1917 Julius Wagner-Jauregg, professor of neurology at Vienna

Whittingham Mental Hospital, Lancashire, in July 1922, with the associated supervision of the professor of tropical medicine at the Liverpool school, and in the following year the treatment was extended to about a dozen other mental hospitals throughout the country. Its use soon spread to other hospitals and private mental homes, and the Ministry of Health set up an organization for the inoculation of patients by infected mosquitoes.

The mortality, however, was very high. A survey made for the board of control¹ after the first five years showed that out of a

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total of 1,597 patients treated 541 (33.9%) had died in the course of treatment or soon afterwards, 404 (25.3%) had been discharged as cured, and 652 (40.8%) remained in hospital. An analysis of 10 years’ results published from Winwick Mental Hospital is even more instructive. Of 123 patients who were not given malaria or in whom malaria did not “take” all experience with malarial therapy he had made the observation that if the cerebrospinal fluid cell count became normal and remained so for 12 months it would remain normal indefinitely—that is, the infection had been overcome whatever abnormal reactions the fluid might still show. The required period of persistence of the “inactive” state of the fluid was later generally

FIG. 2—Julius Wagner-Jauregg, professor of Neurology at Vienna.

but five died within two years of admission, and four of these died in the third year; of 245 patients treated with malaria 67 were discharged as cured, mostly within two years of admission, 66 died in the course of treatment or soon afterwards, and altogether 103 died within four years of admission.

In 1925 the Metropolitan Asylums Board set up a special clinic at Horton where cases from its mental hospitals could be treated by a trained staff, and for the next 25 years malarial therapy was practised there and at similar clinics all over the world. It was a desperate remedy and a very imperfect instrument, but still it was the first cure for a very desperate disease, and in 1927 Wagner von Jauregg (to give him his proper title) was awarded a Nobel prize.

Penicillin

A new era began with the advent of penicillin. Nothing about penicillin was more wonderful than the fact that it cured general paralysis. It was introduced as an antibacterial remedy, and previous experience of these remedies gave no reason to think that it would be potent against the protozoal infection of syphilis. In fact, it is not potent against any protozoal infections with the exception of a few that due to spirochaetes. Moreover, we had had the arsenical preparations specially designed to destroy spirochaetes, but even they could not overcome spirochaetes firmly entrenched in the nervous tissue of the brain. Again, it was an early discovery that penicillin given intra-muscularly did not find its way into the cerebrospinal fluid; it did not, it was said, pass the blood–brain barrier— but in G.P.I. the blood–brain barrier is no longer intact. General paralysis was a hard nut to crack, and those who first had access to penicillin, though they found that it brought about improvement in their patients, could not believe that it would cure the disease and therefore followed up the penicillin with malaria.

So far as I know the first person who realized that penicillin alone was sufficient was the late Bernard Dattner (Fig 3), who had a clinic at Bellevue Hospital, New York, associated with the New York State University. Dattner was one of Wagner-Jauregg’s assistants who had emigrated to America. In the course of his

FIG. 3—Dr. Bernard Dattner (by courtesy of National Library of Medicine, Bethesda, Ma.)

accepted as six months. Dattner found that in patients treated with large doses of penicillin, while clinical improvement might still be slow, the spinal fluid became of the inactive type within a few months and remained so, and thus satisfied his criteria of cure of the infection. At that time the inactive fluid and its significance were not widely known, and the rest of the medical world could not believe that general paralysis could be cured by 10 days’ treatment with penicillin, and those who used penicillin continued to follow it up with malaria.

In Britain some penicillin became available to hospitals in 1943 through the American Forces, and as a consequence of favourable reports from America we began to treat G.P.I. and other cases of neurosyphilis with such amounts of penicillin as we could then obtain, and having had very unfortunate experiences with malaria I was very glad to avoid using it. After five years I gave a paper to the Society for the Study of Venereal Diseases but it was received with incredulity, and it was about another five years before the fact that penicillin alone was sufficient gained universal acceptance. By that time certain other antibiotics—in particular, the tetracyclines—had turned out to be just as effective as penicillin.

Now, provided the patient comes under treatment before dementia is far advanced, there are few conditions more satisfactory to treat than general paralysis, but the disease has almost disappeared. The number of deaths registered in 1968 was only 24, and it is most probable that this figure was made up of old patients who had been treated many years ago but because of their residual dementia had never been discharged from hospital. There are rare fulminating cases dominated by convulsions, but, these apart, no patient is likely to die now of general paralysis.

References