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The Neurosyphilitic Psychoses Today

A Survey of 91 Cases

By KENNETH DEWHURST

Neurosyphilis, causing a psychotic illness of such severity as to necessitate admission to a mental hospital, though now rare, has not been completely eradicated. This study is based on 91 psychotic patients with neurosyphilis admitted to six mental hospitals between 1950 and 1965. Its main purpose is to ascertain the incidence, and to present the natural history of the neurosyphilitic psychoses during a period when antibiotics were available. It is likely that some patients in this series were given penicillin for an intercurrent infection in complete ignorance of the underlying syphilitic process. Indeed, Joffe, Black and Floyd (1968) and Heathfield (1968) have reported modifications in the clinical picture of neurosyphilis, tending to mask the diagnosis, caused by earlier administration of antibiotics for intercurrent infections. Thus the widespread use of antibiotics, though greatly reducing the incidence of neurosyphilitic psychosis, may well have increased the mutability of the disease as reflected in its changing prevalence, distribution and clinical characteristics.

I. Method

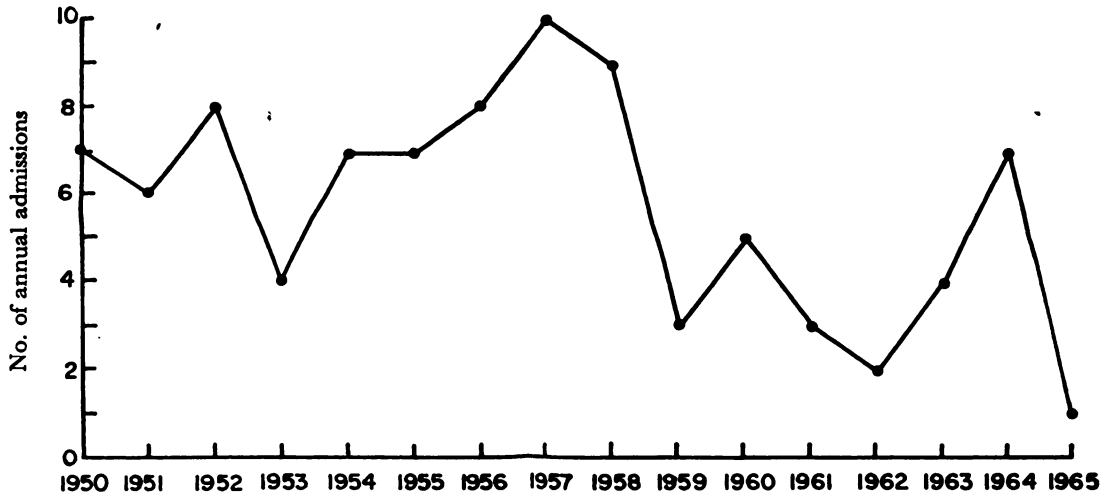
Clinical notes of patients with neurosyphilitic psychosis admitted between 1950 and 1965 were traced in six mental hospitals. Whenever possible, a cross-check of the laboratory registers of patients whose cerebrospinal fluid (C.S.F.) was positive for neurosyphilis was carried out. Laboratory registers were checked at Littlemore Hospital, Oxford, St. Crispin's Hospital, Northampton, and Stoke Mandeville Hospital, Aylesbury (serving St. John's Hospital, Stone), so that a true incidence of the disease in areas served by these hospitals has probably been obtained. A laboratory cross-check was not carried out in the other three hospitals, Fairmile, Knowle and St. James's. Although the incidence of neurosyphilitic psychosis in the areas served by these latter hospitals cannot be regarded as accurate, their inclusion contributes to our knowledge of the clinical features, course and natural history of the disease.

II. Incidence

The graph (Fig. 1) illustrates the peak incidence of neurosyphilis between 1957 (10 cases) and 1958 (nine cases). A Ministry of Health Report (1959) shows that the peak incidence of primary syphilis occurred in 1946, although Jefferiess (1962) found that most admissions to St. Mary's Hospital, Paddington (where approximately one-tenth of the venereal disease

	Number of cases between 1950–1965 (inclusive)		
	Male	Female	Total
St. Crispin's, Northampton	20	8	28
Littlemore, Oxford	17	10	27
Fairmile, Wallingford	15	5	20
St. John's, Stone, Aylesbury	5	3	8
Knowle, Fareham	3	2	5
St. James's, Portsmouth	2	1	3
	62	29	91

Graph showing annual admission rate of 91 neurosyphilitic patients between 1950–1965



in England and Wales is treated) occurred in 1947. In this series the peak incidence of neurosyphilis occurred in 1957 and 1958, eleven years after the zenith of primary syphilis (1946 and 1947) which is the time interval suggested by most authorities as the incubation period of neurosyphilis with its concomitant psychoses.

In the Oxford area, 27 patients were admitted to Littlemore Hospital, and one was admitted to the Warneford Hospital (personal communication, McInnes, 1965). This represents an annual incidence of 1·8 cases of neurosyphilitic psychosis during the fifteen years when the mean population served by these hospitals totalled 373,000. Similarly, the 28 patients admitted to St. Crispin's Hospital, Northampton, represent an annual incidence of 1·8 cases of neurosyphilitic psychosis in an average population of 386,000 during the same period (personal communication, Golding, 1967). The mean incidence, therefore, of neurosyphilitic psychosis in the Oxford and Northampton areas is approximately one case to 200,000 of the general population.

The incidence of neurosyphilitic psychosis is lower in the area served by St. John's Hospital than elsewhere in the Oxford Region. The mean population at risk was 302,900 when the average annual admission rate was 0·5, giving a general population incidence of 1 in 605,800. This threefold *decrease* as compared with Oxfordshire and Northamptonshire is due to the fact that the catchment area of St. John's Hospital is essentially rural, and is defined as "Buckinghamshire except the borough of Slough, the urban districts of Beaconsfield and Eton and the rural district of Eton" (Golding, 1968). In this area a high proportion of males are employed in agriculture, with a correspondingly high exemption rate from military service. Hence this predominantly rural catchment area wherein fewer males do military service than in other areas in the Oxford Region probably explains the lower incidence of neurosyphilitic psychosis in Buckinghamshire.

III. Socio-Economic Data

(*a*) *Civil status.* Fifty-four patients were married (59·2 per cent.), 17 were single (18·6 per cent.) and 19 (20·8 per cent.) were living apart from their spouses, being either widows or widowers, divorced or separated. The civil status of one patient was not known.

(*b*) *Age of onset and sex ratio.* Ages on admission of patients in this series ranged from 28 to 75 years, with a mean of 51·3 years. There were 62 males and 29 females giving a sex ratio of 2·1 to 1.

(*c*) *Nationality.* Eighty-six patients (94·5 per cent.) were British, and five (5·5 per cent.)

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were born outside this country. These include one patient from each of the following countries: Yugoslavia, Poland, Lithuania, Ukraine and the West Indies.

(*d*) *Religion.* Seventy patients (77 per cent.) professed to be members of the Church of England; 11 (12 per cent.) were Roman Catholics, and 7 (8 per cent.) were Nonconformists. One patient was a member of the Greek Orthodox faith, and the religion of the remaining two patients was not known. There were no declared atheists nor agnostics.

(*e*) *Occupation and military service*

	Bramwell (1902)	Present series (1950–1965)
Labourers	55	37
Tradespeople	45	21
Professional	27	4
Unclassified	28	0
	155	62 (males only)

An occupational analysis reveals a preponderance of labourers and unskilled workers. It is, however, somewhat alarming to find such potentially dangerous occupations as engine drivers (2), lorry drivers (3), a master mariner, a railway guard, and a colliery deputy who was, just prior to admission, responsible for dynamiting part of the coal face. Fortunately the ravages of the disease forced either a premature retirement or a change of occupation before deterioration warranted admission to a mental hospital.

Of the 62 male patients, 66·1 per cent. had served at some time in the armed forces (26 in the 1939–1945 war, and 15 in the 1914–1918). Only eight patients (12·9 per cent.) had not served in the forces. It is not known whether the remaining 13 patients had ever done military service.

IV. Clinical Data

(*a*) *Duration of symptoms before admission* varied between 24 hours and five years. In 79 patients the duration was as follows:

Under 4 weeks	14	12–18 months	10
1–6 months	28	2 years	8
6–12 months	11	3 years and over	8

Patients' relatives reported depression, headaches, forgetfulness, insomnia, irritability, apathy and epilepsy as the commonest early symptoms.

(*b*) *Presentation on admission.* In 45 cases some specific incident precipitated hospital admission. Police were involved in 13 admissions, either because of law-breaking, or because of the patients' complaints about the behaviour of others. Eight patients were admitted as a result of memory lapses such as losing their way in familiar surroundings. Seven patients were admitted after outbursts of violence. Three patients ordered large quantities of unwanted goods, for which they were unable to pay. There were three cases of indecent exposure. Epileptic seizures led to the admission of six patients, and there were five cases of attempted suicide. The onset was insidious in the remaining 46 patients.

(*c*) *Source of admission.* Thirty-one patients (34·5 per cent.) had been referred to mental hospitals after initial treatment at general hospitals. Two patients had been treated in mental hospitals other than those included in this study. The remaining 58 patients (63·6 per cent.) were direct admissions.

(*d*) *Initial diagnosis.* In 24 cases (26·4 per cent.) a diagnosis of neurosyphilis was established at the onset of the illness. The most common initial diagnosis was that of depression, and in this series 28 patients (30·8 per cent.) were first diagnosed as suffering from either reactive, endogenous, involutional or senile depression. Furthermore, 19 patients (20·9 per cent.) had E.C.T. and two others had impramine hydrochloride (Tofranil).

The next most common initial diagnosis was dementia represented in this series by 13 cases (14·3 per cent.). Eight patients (8·8 per cent.) presented as confusional states; six (6·6 per cent.) were diagnosed as schizophrenia, and another six patients were thought to be suffering from hypomania. Three patients presented as epileptics, and rare diagnoses included atypical Hodgkin's disease, disseminated sclerosis and morbid sexual jealousy.

(*e*) *Incubation period.* It was possible to date the initial infection with any degree of accuracy in only 21 patients (23 per cent.). The interval between infection and admission to a mental hospital varied between 4 and 41 years, with a

mean of 21 years. This prolonged incubation period was to some extent due to the inclusion of nine patients who were admitted to mental hospitals between 20 and 41 years after the initial infection. They were survivors of the First World War, and had a vague history of arsenical injections at the time of the primary infection. Unfortunately, treatment was never completed. One patient developed jaundice after six injections, and another stated that the injections had been discontinued because he was found to be "hypersensitive to 606". The interval between primary infection and onset of mental symptoms in 12 patients who had no previous treatment ranged from 4 to 15 years, with a mean of 10·5 years.

(*f*) *Types of neurosyphilis*

	No.	%
Simple depressed type	25	27·4
Simple dementing type	19	20·8
Taboparesis	16	17·6
Grandiose or expansive type	10	10·9
Manic type	5	5·5
Senile type	6	6·6
Protracted or stationary type	4	4·4
Other types of neurosyphilis	6	6·6
Total	91	100·0

Many patients exhibited two symptoms, such as dementia and depression: in these cases, only the predominant feature has been classified. It has long been claimed that cerebral syphilis most commonly presents with delusions of grandeur, but in our series only 10·9 per cent. showed this symptom. Expansive delusions are commonly associated with states of hypomania, and there is often (as in this series) some degree of overlap between these two classifications. But when grandiose and hypomanic types of neurosyphilitic psychosis are classified together, they still represent only 16 per cent. of the total.

(*g*) *Summary of abnormal neurological signs.* Of 91 patients, eight (8·7 per cent.) had no abnormal neurological signs on admission. No information was available on the physical state of a further four patients (4·3 per cent.). The remaining 79 patients had several neurological abnormalities, which are listed in order of their frequency:

Neurological signs	No.	%
Reflex abnormalities	47	51·6
Slurred speech	22	24·1
Tremors	20	21·9
Ataxia	18	19·7
Diminished deep pain sensation	11	12·0
Alterations in muscle tone	4	4·3
Hemiplegia	1	1

Pupillary abnormalities	No.	%
Irregular or unequal pupils with sluggish reaction to light	33	36·2
Argyll Robertson pupils	20	22·0
Normal findings	34	37·4
No information	4	4·4
TOTAL	91	100

(*h*) *Incidence of epilepsy.* Seventeen patients (18·7 per cent.) developed epileptiform fits due to cerebral syphilis. Varma (1952) found 8 out of 40 patients with epilepsy. These findings represent a much lower incidence of epilepsy arising from neurosyphilis than has been reported elsewhere. In his comprehensive survey, Bruetsch (1959) states than convulsions, apoplectic phenomena or psychomotor epilepsy occurred in 35–65 per cent. of cases; and according to Brain (1962) about half of all cases of neurosyphilis have fits.

(*i*) *Infection of marital partner*

	No.	%
No information	25	46·3
No infection of partner	21	38·9
Wife infected by husband	6	11·1
Husband infected by wife	2	3·7
Total married	54	100

V. OUTCOME

(*a*) *Course of the illness.* Of 91 patients reviewed in this survey, 18 (19·7 per cent.) died in hospital, 27 (29·7 per cent.) became chronic mental hos-

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pital patients, two were transferred before treatment was started, and the remaining 44 (48·3 per cent.) were discharged after treatment. This latter group of 44 discharged patients had a total of 66 admissions to mental hospitals, ranging from three years to two days with a mean stay of 17 weeks.

Of the 45 patients who died or became chronic mental hospital inmates, 14 had reached a mental hospital after first being treated in a general hospital: the remaining 31 patients were admitted directly to the mental hospital.

(*b*) *Course of illness in relation to treatment regimes.* Of those having combined therapy, 20 per cent. were discharged, whereas 29 per cent. were discharged after penicillin alone. Only 14·6 per cent. of patients having combined treatment died or are still in hospital, whereas 55·1 per cent. met a similar fate amongst those patients who had penicillin alone. No definite prognostications can be drawn from these figures, as the selection of cases for one or other type of treatment was not strictly comparable. This analysis is merely a survey of past therapy rather than a guide to prognosis or choice of treatment. (See Table at foot of page.)

(*c*) *Number of courses of antibiotics per patient*

No. of courses	No. of patients	No. of dead and chronic patients	Discharged patients
1	40	16	24
2	26	15	11
3	15	10	5
More than 3	8	4	4

(*d*) *Adverse reactions to drugs.* It is difficult in a retrospective survey to assess the full extent of adverse reactions to medication, as in many instances slight rises of temperature, even if noted, were not always recorded. In this series of 91 patients, 89 of whom had penicillin together with other anti-syphilitic drugs, adverse reactions were rare. One patient had a rise of temperature after the third injection of acetylarsan. Treatment was discontinued, and the patient did not have any pyrexia during a subsequent course of penicillin. Another patient had a temperature of 102° F. after the first injection of 1 mega unit of sol. penicillin. Treatment was continued without further untoward effects. A third patient became slightly jaundiced after an intravenous injection of neoarsphenamine. The jaundice cleared up after arsenicals were discontinued.

(*e*) *Course of illness in relation to E.C.T.* The problem whether injury can alter vascular permeability, and allow spirochaetes and their toxins access to brain tissue, or by some other mechanism light up a latent process, is virtually incapable of rigid proof. Nevertheless, patients in mental hospitals are often subjected to a standardized type of electrical trauma in the form of E.C.T. The outcome of those having this treatment can be compared with that for other patients who did not have it.

Variations in the age of patients, of duration of illness, and of the numbers in the two groups render a true comparison difficult. In the present series, 19 patients had a total of 171 E.C.T.s. The number per patient ranged from 1 to 20, with a mean of 9. Of the 14 males and 5 females given E.C.T., 8 were discharged, 6 died and 5 remained as chronic patients. Their ages ranged from 31 to 66 years, with a mean of 53·2 years. These figures give a percentage of 57·8 per cent. of patients dying or remaining as chronic patients after E.C.T. A total of 72 patients (49 males and 23 females) did not

Treatment	No.	%	Died during or afterwards	In hospital	Improved discharged	Complete recovery
Combined fever and penicillin	31	34·8	1 (1·1%)	12 (13·5%)	13 (14·6%)	5 (5·6%)
Penicillin alone	58	65·1	17 (19·1%)	15 (16·9%)	23 (25·8%)	3 (3·4%)
No treatment	2	2·1	—	—	—	—
TOTAL	91		18	27	36	8

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have any E.C.T. Their ages ranged from 28 to 75 years, with a mean of 51·9 years. Of this group, two were transferred to other hospitals before treatment could be started, 36 were eventually discharged and 34 died or became chronic hospital patients. Although definite conclusions cannot be drawn from such scanty records, it would seem that E.C.T. should be given cautiously unless serology is negative.

Discussion

This investigation shows that the peak incidence of the neurosyphilitic psychoses occurred between 1957 and 1958. Steel (1960) reported the admission of 18 patients with general paresis to the St. Pancras Observation Unit of University College Hospital between April, 1957, and September, 1958. He concluded that neurosyphilis was on the increase, although it would seem that his cases coincided with the peak incidence of the disease 11 years after the highest incidence of primary infection. Since 1958 the annual incidence has fallen sharply, and in spite of the occasional fluctuation has since remained low. Laird (1962) failed to detect an increase in neurosyphilitic psychosis among admissions to mental hospitals in Manchester between 1951 and 1955 and between 1956 and 1960.

The socio-economic background of patients with neurosyphilitic psychosis has not been studied in Britain since the introduction of antibiotics, although Hare (1959) has published an epidemiological survey of changes in the natural history of the disease in Western Europe during the past 150 years. Hare found that when general paresis first appeared in a country the sex ratio was high, with a large number of male and few female patients. The ratio gradually narrowed to between two to four males to one female patient, and Hare concludes that a low sex ratio reflects changes in social attitudes, particularly alterations in sexual behaviour consequent upon the increasing emancipation of women. In Budapest, Orban (1957) reported a sex ratio of 2·1 to 1, the same as in the present series. In America, Hahn *et al.* (1959) found a sex ratio of 3 to 1 in 1,086 patients with dementia paralytica. In Peking, between 1933 and 1934, Liu (1960) reported a sex ratio of 4·4 to 1 in 135 patients admitted to a mental hospital with neurosyphilitic psychosis. But in rural India, where the emancipation of women has hardly begun, Varma (1952) found that 40 males with dementia paralytica were admitted to the Ranchi Mental Hospital between 1925 and 1950, but there were no female admissions with this diagnosis.

Kinnier Wilson (1940) stated that no social bias could be discerned in the incidence of neurosyphilis. This opinion was probably based on the findings of Bramwell (1902). The present series illustrates the marked decline during the past 60 years in the incidence of neurosyphilis in the higher social groups.

Neurosyphilitic psychosis most commonly presents as a depressive illness. The dementing type is the next most frequent in this series. Only ten patients (10·9 per cent.) presented with grandiose delusions. In America, Hahn *et al.* (1959) found that the simple dementing type was more common than all the other varieties combined. Vurdelja, Vuckovic and Kapamadzija (1961), in Yugoslavia, found that most patients presented with dementia, whereas only 15 out of 194 patients expressed grandiose delusions. Liu (1960), in Peking, found 39 per cent. of patients with grandiose delusions, and Varma (1952), in India, reported that 57·5 per cent. expressed "expansive and grandiose" delusions.

Hare (1959) has also traced the presenting psychiatric syndromes in neurosyphilis during the past 150 years. Before 1870 the grandiose type of G.P.I. was the most common in continental Europe. It was gradually replaced in frequency by the dementing type. In Munich, Bostroem (1930) found that only 10 per cent. of 1,218 patients with dementia paralytica seen between 1920 and 1930 had grandiose delusions.

In Britain, the grandiose type of G.P.I. ceased to be the most frequent variety in the early years of this century (Craig, 1905; Stoddart, 1912). Power (1930) reported that 30 per cent. to 50 per cent. of patients presented with the simple dementing type, the grandiose variety having decreased by between 40 per cent. to 43 per cent. between 1907 and 1922. Similar trends were reported by Lomholt

(1944) from Copenhagen, and Froshang and Ytrehus (1956) from Oslo.

What has caused this alteration in the frequency of various types of dementia paralytica? Delusional systems are influenced, to a great extent, by changes in the socio-economic milieu rather than the nature of the psychosis. Thus, schizophrenic delusions and those occurring in dementia paralytica are both influenced by changes in the socio-economic milieu. Alterations in the predominant delusions in schizophrenia during the past 100 years have been traced by Klaf and Hamilton (1961). They have shown that in the mid nineteenth century religious preoccupations were three times as common as they are today, whereas sexual preoccupations are now twice as frequent.

Lucas, Sainsbury, and Collins (1962) found that religious preoccupations were common in single persons, and that grandiose delusions occurred more frequently in members of the higher social groups. The great decrease in grandiose delusions in patients with dementia paralytica during the past 60 years may therefore be related to the lower incidence of patients with this disease from the higher social groups.

In the present series, changes in the reflexes were the most common neurological abnormalities (51·6 per cent.). Varma found that tremors and slurred speech occurred more frequently, although 65 per cent. of his patients did have abnormalities of their reflexes. In Liu's series, 30 per cent. had reflex abnormalities, 25 per cent. had tremors, 24 per cent. had slurred speech and 11 per cent. presented with ataxia. Liu also reported a higher incidence of Argyll Robertson pupils (46·3 per cent.) than was found in either Varma's (12·5 per cent.) or the present series (22 per cent.).

This survey shows that the prognosis of the neurosyphilitic psychoses is by no means hopeless, since nearly one-half of the patients were discharged after treatment. Adverse reactions to drugs were few and mild. It would seem that King (1959) is correct in stating that adverse reactions to penicillin in cases of neurosyphilis are rare, and that "the dangers have been over-emphasized in the past".

Although the effect of E.C.T. on the course of neurosyphilis cannot be definitely assessed, there are indications that this treatment should be given with caution unless the serology is negative.

An analysis of the treatment has been presented without comment or evaluation, as this aspect of the subject will be dealt with in detail in a later paper.

Summary

(1) The incidence of the neurosyphilitic psychoses in Oxfordshire, Northamptonshire and Buckinghamshire has been ascertained and compared.

(2) Of the 91 patients studied, one-third reached mental hospitals via general hospitals, the other two-thirds being direct admissions.

(3) The socio-economic background shows that military service was the most important occupational hazard. The majority of patients were unskilled workers, and nearly 40 per cent. of them were maritally unattached, when admitted to mental hospital. Changes in the delusional pattern and sex ratio of the disease are discussed.

(4) The most common variety of neurosyphilitic psychosis was found to be the depressed type followed by the dementing type. Only 10·9 per cent. of patients presented with grandiose delusions.

(5) The duration of the incubation period, the degree of infectivity; the incidence of epilepsy and the most commonly occurring neurological signs have been studied.

(6) The effects of E.C.T. and the outcome after various forms of treatment have been analysed. Nearly half of the patients in this series were eventually discharged from mental hospital.

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References

Bostroem, A. (1930). *Handbuch der Geisteskrankheiten*. Ed. O. Bumke. Berlin, 8, 165.

Brain, Lord (1962). *Diseases of the Nervous System*. Sixth ed. London: O.U.P.

Bramwell, B. (1902). "Analysis of 155 cases of tabes." *Brain*, 25, 19–84.

Bruetsch, W. L. (1959). In: *American Handbook of Psychiatry*. Ed. Silvano Arieti, 2, chapter 50, 1003–1005.

Craig, M. (1905). *Psychological Medicine*. First ed. London: Churchill.

Froshang, H., and Ytrehus, A. (1956). "A study of general paralysis with special reference to the reason for the admission of these patients to hospital." *Acta psychiat. neurol. Scand.*, 31, 35.

Golding, D. R. (1967). Personal communication.

—— (1968). Personal communication.

Hahn, R. D., Webster, B., Weickhardt, G., Thomas, E., Timberlake, W., Solomon, H., Stokes, J. H., Moore, J. E., Heyman, A., Gammon, G., Gleeson, G. A., Curtis, A. C., and Cutler, J. C. (1959). "Penicillin treatment of general paresis (dementia paralytica)." *A.M.A. Arch. Neurol. and Psychiat.*, 81, 557–590.

Hare, E. H. (1959). "The origin and spread of dementia paralytica." *J. ment. Sci.*, 105, 594–626.

Heathfield, K. W. G. (1968). "Neurosyphilis." *Brit. med. J.*, *i*, 765–766.

Jefferiess, F. J. G. (1962). "The return of the venereal diseases." *Ibid.*, *i*, 1751–1763.

Joffe, R., Black, M. M., and Floyd, M. (1968). "Changing clinical picture of neurosyphilis. Report of seven unusual cases." *Ibid.*, *i*, 211–212.

King, A. J. (1959). "Drugs in the treatment of syphilis." *Ibid.*, *i*, 355, 431–432.

Klaf, F. S., and Hamilton, J. G. (1961). "Schizophrenia—a hundred years ago and today." *J. ment. Sci.*, 107, 819–827.

Laird, S. M. (1962). "Incidence of general paralysis of the insane." *Brit. med. J.*, 524–525.

Liu, M. C. (1960). "General paresis of the insane in Peking between 1933–1943." *J. ment. Sci.*, 106, 1082–1092.

Lomholt, T. M. (1944). "Clinic and progress of malaria-treated paralysis." *Acta psychiat. neurol. Scand.*, Suppl. 30.

Lucas, C. J., Sainsbury, P., and Collins, J. C. (1962). "A social and clinical study of delusions in schizophrenia." *J. ment. Sci.*, 108, 747–758.

McInnes, R. G. (1965). Personal communication.

Ministry of Health (1959). *Report for the Year 1958* (Pt. II), 59, 252. London: H.M.S.O.

Orban, T. (1957). "Experiences with a follow-up examination of 200 tabetic patients." *Acta psychiat. neurol. Scand.*, 32, 89–102.

Power, T. D. (1930). "The aetiology of general paralysis of the insane." *J. ment. Sci.*, 76, 524.

Steel, R. (1960). "G.P.I. in an observation ward." *Lancet*, *i*, 121.

Stoddart, W. H. B. (1912). *Mind and its Disorders*. Second edition. London.

Varma, L. P. (1952), "The incidence and clinical features of general paresis." *Indian J. Neurol. Psychiat.*, 3, 141–163.

Vurdelja, N., Vuckovic, S., and Kapamadzija, B. (1961). "Die progressive Paralyse heute." *Arch. Psychiat. Nervenkr.*, 202, 177.

Wilson, S. A. Kinnier (1940). *Neurology*. London.

Kenneth Dewhurst, D.Phil., D.P.M., *Research Psychiatrist, Littlemore Hospital, Oxford*

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