complexity. It may seem derisory, then, to return to Langdon-Brown's parallel of the orchestra as a model for the endocrine system. As a biological analogy, however, it has some meaning for us. An orchestra is a group of individuals harmoniously loyal to their higher control and playing with a common purpose towards a common end—the best possible interpretation of the piece of music in front of them. In the endocrine system is a group of individual organs, with much more complicated relationships and with controls which, although complex, are yet unified, working with a common purpose towards a common end—the maintenance of homeostasis in the body.

I have looked in human affairs for a more appropriate analogy than the orchestra, but I have failed to find one. Man's social, political, and industrial organization, though a growth of many thousands of years, is but an embryo in biological evolution in comparison with the endocrine system. We may conclude, then, that, far from any of man's affairs providing an exact parallel for the endocrine system, the mechanisms of the endocrine system provide a model for man.

Langdon-Brown in his Maudsley Lecture delivered in 1936, and reprinted in his fine book of essays entitled *Thus We Are Men* (1938), discussed the biology of social life. He defined three phases of man's social evolution. In the first, individuality is at a discount and the community is held together by taboo and fertility rites. In the second phase, individualities develop and religious belief is towards individual salvation and personal immortality. We have not yet emerged into the third phase, in which the community works consciously, not instinctively as do the bees and the ants, and not without purpose aforethought as does the endocrine system, towards a common good. Langdon-Brown would have seen it as ironical, and yet not without hope for mankind, that the first hint of this conscious co-operation should have been, not for a common good, but for the avoidance of a common evil—the total destruction of man itself.

We would salute Langdon-Brown across the years as a devoted servant of this College, a fine physician, and in his time a pioneer of medical thought—and I part from him with this valedictory sentence which he chose for himself, "The life to which I belong uses me, and will pass beyond me, and I am content."

I am grateful to those who, by their discussions, have given me help in the preparation of this lecture. They include Dr. K. Brown-Grant, Dr. Calvin Ezrin, Dr. Melvin Grumbach, Professor G. W. Harris, Dr. R. L. Holmes, and Dr. Anita Mandl.

REFERENCES

- Bartter, F. C., Mills, I. H., Biglieri, E. G., and Delea, C. (1959). *Recent Progr. Hormone Res.*, **15**, 311.
Brown-Grant, K. (1960). *Brit. med. Bull.*, **16**, 165.
— Harris, G. W., and Reichlin, S. (1957). *J. Physiol. (Lond.)*, **136**, 364.
Cushing, H. (1930). *Lancet*, **2**, 119, 175.
Di George, A. M., d'Angelo, S. A., and Paschkis, K. E. (1957). *J. clin. Endocr.*, **17**, 842.
Evans, H. M., and Simpson, M. E. (1928). *J. Amer. med. Ass.*, **91**, 1337.
Everett, J. W. (1954). *Endocrinology*, **54**, 685.
— (1956). *Ibid.*, **58**, 786.
Ezrin, C., Swanson, H. E., Humphrey, J. G., Dawson, J. W., and Wilson, W. D. (1958). *J. clin. Endocr.*, **18**, 917.
— — — — — and Hill, F. M. (1959). *Ibid.*, **19**, 621.
Farrell, G. (1959). *Recent Progr. Hormone Res.*, **15**, 275.
— (1960). *Acta endocr. (Kbh.)*, **34**, Suppl. 50, p. 57.
Felber, J. P., Reddy, W. J., Selenkow, H. A., and Thorn, G. W. (1959). *J. clin. Endocr.*, **19**, 895.

- Flerkó, B., and Szentágothai, J. (1957). *Acta endocr. (Kbh.)*, **26**, 121.
Gilliland, I. C., and Strudwick, J. I. (1956). *Brit. med. J.*, **1**, 378.
Greer, M. A. (1957). *Recent Progr. Hormone Res.*, **13**, 67.
— (1960). In *Clinical Endocrinology*, edited by E. B. Astwood, p. 1. Grune and Stratton, New York.
Harris, G. W. (1955). *Neural Control of the Pituitary Gland*. Arnold, London.
— (1960). *Acta endocr. (Kbh.)*, **34**, Suppl. 50, p. 15.
— and Woods, J. W. (1958). *J. Physiol. (Lond.)*, **143**, 246.
Harrison, M., and Fraser, R. (1960). *Brit. med. J.*, **2**, 535.
Hubble, D. (1952). *Lancet*, **1**, 1123.
— (1955). *Ibid.*, **1**, 1.
— (1957). *Brit. med. J.*, **1**, 601.
Hudson, B. (1960). In *Clinical Endocrinology*, edited by E. B. Astwood, p. 649. Grune and Stratton, New York.
Jefferson, A. A. (1957). *Ann. roy. Coll. Surg. Engl.*, **21**, 358.
Keynes, G. (1954). *Brit. med. J.*, **2**, 659.
Langdon-Brown, W. (1922). *N.Y. med. J.*, **115**, 373.
— (1931). *Practitioner*, **127**, 614.
— (1938). *Thus We Are Men*. Kegan Paul. Trench, Trubner, London.
Lerner, A. B., Lee, T. H., Wright, M. R., and McGuire, J. S. (1960). *Acta endocr. (Kbh.)*, **34**, Suppl. 50, p. 17.
Li, C. H. (1957). *Advanc. Protein Chem.*, **12**, 269.
McConahey, W. M., Myers, W. R., and Gastineau, C. F. (1960). *Acta endocr. (Kbh.)*, **35**, Suppl. 51, p. 355.
Martin, M. M., and Wilkins, L. (1958). *J. clin. Endocr.*, **18**, 679.
Mason, J. W. (1959). *Recent Progr. Hormone Res.*, **15**, 345.
Nikitovich-Winer, M., and Everett, J. W. (1958). *Endocrinology*, **63**, 916.
Purves, H. D. (1960). *Acta endocr. (Kbh.)*, **34**, Suppl. 50, p. 21.
Russfield, A. B., Reiner, L., and Klaus, H. (1956). *Amer. J. Path.*, **32**, 1055.
Smith, P. E. (1930). *Amer. J. Anat.*, **45**, 205.
Swanson, H. E., and Ezrin, C. (1960). *J. clin. Endocr.*, **20**, 952.
Van Dyke, H. B. (1960). In *Clinical Endocrinology*, edited by E. B. Astwood, p. 68. Grune and Stratton, New York.
Van Wyk, J. J., and Grumbach, M. M. (1960). *J. Pediat.*, **57**, 416.

MENTAL HOSPITAL INS AND OUTS

A SURVEY OF PATIENTS ADMITTED TO A MENTAL HOSPITAL IN THE PAST 30 YEARS

BY

ALAN NORTON, D.M., D.P.M.

Consultant Psychiatrist, Bexley Hospital, Kent,
and Lewisham Hospital, London

In 1957 Brill and Patton reported that between March, 1955, and March, 1956, there had been a fall of 452 in the population of the New York State mental hospitals. Since a steady rise of 2,000 patients a year had been expected to continue, this fall excited much interest. In 1959 the same authors showed that the decline had continued in the next three years by 453, 1,218, and 1,988 patients respectively, out of a total mental hospital population of 90,000. Kramer and Pollack (1958) were able to confirm that the decrease in 1956 was not confined to New York and that it was common to 39 of the 48 States. In that year there was a total drop of 7,400 in the mental hospital population of the United States. By the end of 1957 a further fall of 3,200 had been recorded.

Experience has been similar in England and Wales. The Annual Abstract of Statistics (1960) shows that the decline also began in 1955 and that by the end of 1959 there were about 15,000 fewer patients in mental hospitals than at the end of 1954, when a peak of 148,600 was reached. This fall had occurred despite a rising number of admissions. The decline has upset the calculations of the more gloomy prophets—for example, Norris (1959), who expected the mental hospital population to rise to 159,000 by 1960.

In Bexley Hospital in recent years the figures have followed the national trend, and the number of female patients has fallen from a peak of 1,284 at the end of 1954 to 1,165 at the end of 1959. One has had a strong impression that far fewer patients are "becoming chronic" and that this trend long preceded the introduction of the tranquillizing drugs in 1954, to which Brill and Patton (1957, 1959) attach primary importance. In order to try to check the reliability of this vague impression I have carried out an analysis of the duration of stay and the outcome of treatment for groups of patients admitted at various times in the past 30 years.

Material

The material under survey consists of the total intake of female patients for 1928-30, 1934-6, 1949-50, 1953, and 1957. The assessment of those admitted in earlier years was brought up to date in the last three months of 1959.

The inquiry was restricted to female patients for several reasons. The main one was that at that time I was working with them and knew at least half of the more recent admissions, and most of those who had remained from earlier years. In addition, there do seem to be such important differences between mental illnesses in men and women, in incidence, in age distribution, in manifestations and course, and perhaps even in ultimate prognosis, that they are best considered separately.

A study of length of stay and outcome has much more meaning if it is related to diagnosis as well as to sex, marital status, and such other information as is usually recorded in hospital registers. But diagnosis is a thorny problem in psychiatry. I have attempted to provide a retrospective diagnosis in every case, despite the risk that a knowledge of the outcome would influence one's diagnosis, and, like Shepherd (1957), I have used all the available records to try to arrive at a correct one. I was eventually able to find almost all the case-notes (see Table I). No patient whose notes did not come to light is still in hospital.

I began to collect data in April, 1957, and finished in January, 1960. Unfortunately, by the time I read Shepherd's (1957) monograph the investigation was well under way, and I could not modify it to include his valuable calculation of the total time a patient spent

in hospital rather than the total number of times she was admitted.

Results

Although in setting out the results of this inquiry I have preferred to present them separated in broad diagnostic categories, there is some information covering the whole intake which may yield comparisons with other work (Table I).

1. The number of female admissions in a year has risen more than fourfold in 30 years, the number of first admissions threefold (cols. 3 and 6).

2. I have calculated the population at risk for the earlier years by dividing the total population of London by the number of mental hospital beds available, and then multiplying this number by the beds available in this hospital.

3. Readmissions have risen steadily and now form more than half of the total admissions (col. 6). Shepherd (1957) found that female first admissions fell from 68.5% of the total female admissions for 1931-3 to 58% for 1945-7.

4. Temporary patients. The figures in col. 8 confirm the view that this device for avoiding certification never proved very useful.

5. The notable fall in the proportion of single people probably reflects not only the general rise in marriage rates

FIG. 1.—Age distribution of a year's admissions.

but also the rise in average age on admission (cols. 9 and 11). The "expected" figures for single people (col. 10) are derived from the census figures of 1951, which I applied to a population of these patients' age distribution.

6. Lately, over a quarter of the female admissions are 65 years old or more (col. 11). Shepherd (1957) found that by 1945-7 a fifth of his female admissions were of this age.

7. Cols. 12 and 13 show the percentage and number from each year's intake who are still in hospital at the end of two years. The actual numbers have not changed very

TABLE I

Years	No. of Female Admissions	Yearly No. of Female Admissions	Popn. of Catchment Area (approx.)	Missing Case-papers	First Admissions %	Voluntary Patients %	Temporary Patients %	Single %	"Expected" Single %	Aged 65 and Over %	Still in Hospital at End of 2 Years		Still in Hospital at Dec. 31, 1959	
											%	No. (per Year)	No. (from Each Year)	No. with Schizophrenia
1928-30	552	184	481,000	9	66.9	0	0	34.5		10.5	41.3	76	19	16.7
1934-6	621	207	437,000	6	66.5	16.3	3.6	38.9		5.3	41.6	86	28	23
1949-50	639	319.5	521,000	5	50.9	61.8	2.4	26.8	19.5	16.9	17.6	56	20	14.5
1953	516	516	593,000	1	50.7	75.7	1.6	26.6	20.9	20.9	12.4	64	23	11
1957	813	813	649,000	0	44.9	88.7	0.6	20.6	17.2	25.7	8.1	66	66	19

much, but because of the greatly increased total of admissions the proportion is much smaller. Col. 14 shows that more patients remain in hospital who were admitted in any year of the triennium 1934-6 than of those admitted in 1953.

Age Distribution.—This is illustrated in Fig. 1, in which it is also compared with the age distribution of the female home population for 1957 (*H.M.S.O.*, 1958). Although the main bulk of admissions still comes in the fourth, fifth, and sixth decades of life, there has lately been added a large load of very elderly people. By 1957, 8.6% of the admissions were 75 years old or more. The median age of admission, which had fluctuated in the years from 1928 to 1953 between 45 and 48, rose in 1957 to 53.

Diagnosis.—No classification commands universal agreement in psychiatry, except perhaps as regards gross organic illness, and there is still widespread argument about such concepts as "reactive depression," "involutional depression," and "paraphrenia." I have used a very simple classification, but this has, of course, oversimplified the wealth of material encountered both in range and in diversity. There was a small group of patients' illnesses, mainly mixed endogenous and reactive depression, which resisted further classification. This group was larger in the more recent years. Table II and Fig. 2 show the total admissions for each period classified according to diagnosis.

Duration of Stay and Outcome.—These are illustrated for the complete series of patients in Fig. 3.

Schizophrenic Psychoses

I have included paraphrenia within this group, but the numbers of patients with this illness are separately listed in Table II.

Admissions for these illnesses showed a very steep increase by 1953 and again by 1957 (see Table II). Almost three times as many people were admitted with them in 1957 as 30 years earlier. This increase far exceeds that in the population at risk (see Table I), and might at first sight imply that many milder cases are now being admitted. Table III, however, shows

TABLE II

Diagnosis	Yearly Average			1953	1957
	1928-30	1934-6	1949-50		
Schizophrenic psychoses:					
Schizophrenia	31.0	36.3	36.5	68	92
Paranoid schizophrenia	15.0	20.3	19.5	32	53
Paraphrenia	23.3	18.0	16.5	29	44
Endogenous depression	46.0	53.3	104.0	157	296
Mania and hypomania	17.7	19.3	19.5	16	22
Manic-depressive depression	4.7	2.7	7.0	6	3
Reactive depression	1.3	9.0	23.5	35	51
Neurosis and personality disorder	0.3	6.7	33.5	67	94
Puerperal psychosis	5.7	7.0	9.5	17	20
Epilepsy	5.7	6.7	5.5	10	7
Organic psychoses:					
Senile and cerebral vascular	5.7	3.7	15.0	32	70
Alcoholic psychoses	6.7	5.0	3.5	5	1
Syphilis	7.7	4.0	1.5	2	2
Other organic psychoses	10.0	10.3	15.5	28	26
Other	0.3	3.0	6.5	11	32
Total	181.1	205.3	317.0	515	813

FIG. 2.—Admissions of various years according to diagnosis. The areas of the circles are proportional to the number of admissions.

FIG. 3.—Deaths and discharges at various times after admission.

that the number of first admissions to a mental hospital for schizophrenia in 1953 was the same as it was 25 years before, and that even in 1957 their increase was modest—almost exactly in keeping with the increase in the number of people at risk. There has been a fourfold increase in the past 30 years in readmissions, and Table III shows that readmission much more often happens to-day within a year or so of discharge. The rising readmission rate cannot account for more than a small part of the increase in median age on admission, because this is now well

TABLE III.—*Schizophrenic Psychoses*

	Yearly Average			1953	1957
	1928-30	1934-6	1949-50		
Admissions	69	74.7	72.5	129	189
% certified	100	89.8	61.9	33.1	23.3
% single*	64.5	62.6	63.4	41.4	40.0
Median age* (years)	27.1	29.4	30.6	30.9	38.5
Discharged recovered†	18.7	19.3	31.5	75	119
Median stay of discharges	7 mths	7 mths	6 mths	4.5 mths	9 wks
Still in hospital after 2 yrs	40.7	47	26.5	26	19
First admissions—total	46	49.3	34.5	47	61
Discharged recovered†	31	38	23.5	29	41
Ever discharged	8.7	10	10	22	24
Still in hospital after 2 years	11.3	14.7	18.5	27	38
Median stay of discharges	19.7	24.7	7	5	3
	10 mths	8 mths	5 mths	4.5 mths	8 wks
% already admitted in same or previous year	8.7	8.9	12.4	12.4	15.5
% readmitted in same or next year	3.8	2.2	4.1	14.7	22.2
3 or more previous admissions	1	2.7	8.5	23	54
Left against advice	0	1	6	14	27

* Excluding paraphrenics. † Or much improved.

over 30 even for first admissions. The only alternative explanation for the higher median age on admission to a change in age of onset of the disease is that more of the younger ones now go to the several other hospitals in South London which specialize in first admissions.

The extent of readmission has to be borne in mind in interpreting Fig. 4. This shows a great improvement in the outlook for the illness, or, at least, a much better chance of leaving hospital and a much shorter stay in recent years. In 1957 86.7% of the patients admitted with schizophrenia were out of hospital within a year compared with a meagre 26.5% 30 years ago. In fact, the duration of stay is not nowadays much longer than for those with affective psychoses.

By the end of two years only 19 (10%) of the schizophrenic admissions of 1957 remained in hospital, compared with 41 (59%) from a smaller general population 30 years ago (see also Table III). Shepherd's (1957) figures for female schizophrenics still in hospital after two years were 63% for those admitted in 1931-3 and 48% for admissions of 1945-7. Norris (1959) reported a comparable figure of 38% for admissions of 1947-9.

In this investigation only 12 of the patients admitted with schizophrenia in 1953 were still in hospital after six years; 25 years previously, at the end of the same period after admission, 35 were still in hospital. Nor is the outlook so completely hopeless, as is often supposed, for the patient who has been in hospital for more than three years. Altogether, in the years being considered, 42 such patients left hospital—a not inconsiderable number. Their years of discharge are scattered throughout the past 30 years, but 20 of them left hospital in 1955 and the years following. Most of these had responded well to chlorpromazine.

Some inroads seem, then, to be being made on the chronicity of the illness. Only three of the first admissions of 1957 were still in hospital two years later. A variety of causes may well have contributed to this outcome: the efficacy of physical treatments; the changed atmosphere of the hospital; and a readiness on the part of relatives and the community to accept improved patients at home without too much apprehension.

A corollary of all this is sometimes forgotten. Some attacks seem to clear up completely; other patients do not become completely well, and in their case a fresh attack of illness or altered circumstances may bring them back to hospital several times in the course of the illness. There seems to be no need to be disheartened by these frequent readmissions if they can be regarded as episodes in the long-term management of a patient who, if she had become ill 30 years ago, had only two chances in five (see Fig. 4) of ever being discharged. At least she is now at home and often at work for the greater part of the time.

A few further points from Table III are worth noting. There has been a steady fall in the proportion of certified admissions, which by now has fallen even lower. Secondly, the proportion of single people has fallen

FIG. 4.—Admissions for schizophrenia. Time in hospital and outcome.

to 40%, which is nevertheless greatly in excess of the 18% or so one would expect in a population of this age distribution. Thirdly, only three of the first admissions of 1957 were still in hospital after two years, but of the admissions of that year a smaller proportion were discharged recovered or much improved than of the admissions of 1953. This, if confirmed, might suggest that both patients and doctors are somewhat too hasty in agreeing to discharge, which, however, is achieved far more quickly.

Deaths from Schizophrenia (see Fig. 4).—Patients now hardly ever die directly of schizophrenia. Of the 318 patients admitted with the disease in 1953 and 1957,

only seven died during their stay; four were paralytics over 70 years old, and only one of the others died from causes connected with her mental illness. Of the 431 admitted in the six years 1928–30 and 1934–6, 50 have died, 26 of them from causes which seemed to be directly connected with their mental illness—exhaustion, tube-feeding, swallowing needles, scratching leading to sepsis, lodging of a crust in the throat, subdural haematoma from a fight.

Physical Treatment of Schizophrenia.—The results of this have been very difficult to assess, particularly from old case-records of patients one never knew. The results are expressed in Fig. 5. The newer forms of treatment

have, of course, been given, as they become available, to the more chronic patients with some success. The amount of E.C.T. used in treating the admissions of 1953 may cause some surprise, as may the small numbers treated with deep insulin, but policies vary widely in different hospitals. For example, the hospital that Shepherd (1957) reported on was treating its 1945–7 patients three times more often with continuous narcosis than with E.C.T. The growth of E.C.T. and other forms of treatment is shown for the present series in Fig. 6.

Endogenous Depression and the Manic-Depressive Psychoses

I have included involutional melancholia in this group. The findings are shown in Fig. 7 and Table IV.

Admissions for endogenous depression have shown a sixfold increase in the past 30 years. The

actual number of patients with mania and hypomania has remained almost constant, however, and if allowance is made for the larger population at risk there seems to have been a fall in the prevalence of this illness. First admissions for this whole group of disorders have risen almost threefold.

TABLE IV.—*Endogenous Depression and Manic-depressive Psychoses*

	Yearly Average			1953	1957
	1928–30	1934–6	1949–50		
Admissions	68.3	75.3	130.5	179	321
% certified	100	78.3	29.5	14.5	5.3
Median age (years)	52.1	50.7	54.9	55.0	60.1
Discharged recovered*	40.7	44.3	110.5	144	272
Median stay of discharges	6 mths	5 mths	11 wks	10 wks	7 wks
Still in hospital after 2 years	19.7	22.7	10	15	13
First admissions	39.7	46.3	58.5	76	111
Discharged recovered*	21.3	27	50	58	93
Ever discharged	23.7	30.7	55	72	102
Still in hospital after 2 years	12	12.3	3	6	4
Median stay of discharges	6 mths	5 mths	11 wks	8 wks	7 wks
Aged 65 or more	6.3	4.3	7.5	21	30
% already admitted in same or previous year	5.4	9.7	13.7	12.8	15.6
% readmitted in same or next year	3.4	3.5	7.3	15.7	25.5
3 or more previous admissions	10	8	23	37	79
Left against advice	0	1	6	14	18

* Or much improved.

FIG. 5.—Results of various treatments in schizophrenia.

FIG. 6.—Physical treatment.

Even so the main increase, as with schizophrenia, has been in readmissions, often within a year or so of discharge. In fact, single admissions are the exception. Of the 130 admissions with these illnesses in 1950, only 36 (27.7%) had had no previous attack, and, so far as I could discover, no subsequent one. The corresponding figure for 1953 is 55 out of 179 (30.7%). The general impression, then (see Fig. 7 and Table IV), is of an improved recovery rate after a much shorter stay, but with a minimum of 40% of those discharged needing readmission within the next few years.

Some other points from Table IV are worth noting. The percentage of certified admissions is now very low indeed. The age of admission, even of first admissions, has risen lately, and 27% of the women admitted for the first time with these illnesses are now 65 years old or more. Discharge rates are very high indeed and have been high since at least 1949, particularly for first admissions; it is thus difficult to agree with Norris (1959) that "manic-depressive psychosis is an important contributor to the chronic population of mental hospitals," or that "these conditions have, in the long run, a bad prognosis." Only 13 of the admissions in 1957 were still in hospital two years later, and only 15 died. This, from an intake that included 55 people aged 70 years or more, seems on the face of it not at all bad. But readmission will be needed for 40%, according to Norris, in the next five years, and according to the figures from this hospital, necessarily less complete than hers, in the next six years. Yet readmission, if it does occur, carries the same favourable outlook for a short stay and a good outcome.

Deaths from Manic-Depressive Psychosis.—As with schizophrenia, it was by no means uncommon 30 years ago for the manic or depressed patient to die directly of the disease. Of those 431 manic or depressed patients who came into hospital in the six years 1928–30 and 1934–6, 131 have died, 45 of them from causes directly connected with their illness. On the other hand, of the 15 from the 321 similar admissions in 1957 who have died, 10 were over 70 and only three died of causes directly connected with their illness.

Physical Treatment of Endogenous Depression and Manic-Depressive Psychosis.—The median length of stay of those ever discharged has fallen in the past 30 years

from six months to seven weeks, and the proportion leaving hospital within a year has improved from one-half to nine-tenths. The major part of this change occurred before 1949; that is to say, before all the administrative changes that have transformed mental hospitals in recent years were ever made. Although this investigation was not designed to show causes, the most probable explanation of the improved outlook and shortened stay is the success of E.C.T. Fig. 6 shows the changes in the main kinds of physical treatments used in Bexley Hospital in the last 20 years. Psychiatrists are often on the defensive about E.C.T. But if the alternative, as it was until recently, is a far longer stay in hospital, most patients realize that it would be foolish to reject it. By 1949–50 55% of the admissions for these illnesses were responding well to it. Of the 321 admissions in 1957, 252 (78.5%) were given it; 205 (81%) responded really well, and of these 49 (24%) needed more than a single course; those who did well were given an average of 9.5 treatments, but much the commonest numbers of treatments in a course were 6, 7, and 8.

Organic Psychoses

In the past 30 years patients admitted with senile and arteriosclerotic psychoses have increased twelvefold and now form one-twelfth of all admissions (Table V). Only about 10% are discharged, and this figure has remained unaltered throughout the period of survey. Of the demented patients admitted in 1957, 26 were over 80, a higher proportion of extremely aged people than in

TABLE V.—Number of Patients with Organic Psychoses

	1928–30 Average	1934–6 Average	1949–50 Average	1953	1957
Senile and arteriosclerotic dementia	5.7	3.7	15.0	32	70
Died in 3 months	0.7	0.7	3.0	5	19
" " 12	2.0	1.7	4.0	11	32
Proportion that these form of all admissions of 65 or more	23.7%	22.9%	23.4%	26.8%	31.1%
Presenile dementia	1.7	0.7	2.0	3	5
Huntington's chorea	0.7	0.7	1.0	5	2
G.P.I.	7.7	4.0	1.5	2	1
Alcoholic psychoses	6.7	5.0	3.5	5	1
"Toxic-confusional psychoses"	3.7	2.0	1.5	2	3
Others	4.0	7.0	11.0	18	17
Total	30.0	23.0	35.5	67	99

FIG. 7.—Admissions for endogenous depression and manic-depressive psychosis. Time in hospital and outcome.

earlier years. Despite the increase in senile and arteriosclerotic patients admitted, these illnesses still only account for less than one-third of the admissions who are 65 years old or more.

As is well known, there has been a falling off in admissions for G.P.I., but the decrease would probably be much more striking had male patients been included. The same holds good for alcoholic psychoses, but alcoholism leading to admission or complicating a depressive or psychoneurotic illness, though vastly less common in women than in men, does exist as a mental hospital problem. A minimum estimate for all 1957 admissions is that it complicated the picture in four and was the primary though non-psychotic condition in three more of the women.

A wide variety of psychoses secondary to known physical disease were encountered, and there was a residual group of toxic-confusional psychoses which at the time proved impossible to diagnose more accurately.

Other Conditions

The numbers in these residual groups are shown in Table II. They now amount to one-quarter of all admissions; 30 years ago they accounted for only 7% of admissions.

Puerperal Psychoses.—The proportion that these form of the total admissions has remained stable at about 3% throughout the period. It was reassuring to find that the last puerperal patient to die came in as long ago as 1942, and that the last one to become chronic and to be still in hospital was admitted in 1940. All the 20 admissions for this illness in 1957 had left hospital within three months; 14 of them had responded very well to E.C.T., often coupled with chlorpromazine. Of the 38 admitted in the earliest six years of this series, five died and three are still in hospital after 25 to 30 years.

Reactive Depression, Psychoneuroses, and Personality Disorders.—These groups, which now form more than one-sixth of the admissions, defy classification because they are overlapping categories. I have used the term "reactive depression" for those of good personality who had encountered severe stress. Only seven of those who came in in 1953 and a further seven in 1957 had had previous attacks outside the same and the previous year.

Mixed Depressions.—In this term are included illnesses that show both endogenous and reactive elements and often reveal neurotic personality features as well. They form a difficult group to treat because the presence of one group of factors militates against success in treating the other. E.C.T., for example, worked well in only about a third of them, but other aid, social or psychotherapeutic, was difficult to apply until the endogenous component of the illness had been tackled.

Roth (1960) says that neurotic illness beginning late in life is less uncommon than has hitherto been supposed. In this series about one in 15 of those with reactive and neurotic illnesses was 65 or over, but many of these had previously been admitted to hospital. In 1957 only six people over 65 were admitted for the first time with what seemed to be neurotic or reactive illnesses, in comparison with 30 for endogenous depressive disorders. It may well be that important physical and exogenous factors have played a part in precipitating many illnesses that I have assigned to the endogenous group because of the clinical manifestations, and that the figures from this series are not inconsistent with

Kay's (1959) finding in his Stockholm material that three-quarters of the depressive illnesses of late onset had precipitating causes of these types.

"*Hypochondriasis.*"—I could not escape this diagnosis for a few patients who seemed not to be suffering from a depressive, a paraphrenic, or a hysterical illness. It is a highly unpleasant condition. Of the 12 persons admitted with this diagnosis in 1957, only one of those discharged had made more than a slight improvement and three were still in hospital after two years.

Future Size of Mental Hospitals

The total number of patients remaining in hospital at the end of two years from the date of admission has not changed greatly in the last 30 years. It remains at about 65, though these are now the remainder from a much larger number of admissions than formerly. The diagnoses and age distribution of these chronic patients have, however, changed considerably (see Tables

TABLE VI.—*Diagnosis of Those Who Stayed in Hospital More than Two Years (Percentages)*

Diagnosis	Year of Admission				
	1928-30	1934-6	1949-50	1953	1957
Senile and arteriosclerotic	4.6	2.7	14.4	22.5	30.8
Schizophrenia and para-					
phrenia	56.4	55.8	50.5	42.5	27.7
Depressive and manic	22.0	26.1	18.0	21.2	21.5
Other conditions	17.0	15.2	17.1	13.7	20.0
Total	100.0	100.0	100.0	100.0	100.0

TABLE VII.—*Age Distribution of Those who Stayed in Hospital More than Two Years (Percentages)*

Age—After Two Years in Hospital	Year of Admission				
	1928-30	1934-6	1949-50	1953	1957
Under 25	6.5	7.5	5.9	4.4	1.5
25-44	34.1	34.3	31.3	20.3	12.1
45-64	43.7	46.8	25.4	31.9	31.8
65 and over	15.8	11.4	37.3	43.5	54.5
Total	100.0	100.0	100.0	100.0	100.0

VI and VII). Schizophrenia has been replaced by the senile and arteriosclerotic psychoses as the most important cause of a stay in hospital of two years or more, and more than half of those who stay more than two years are 65 years old or more; in fact, almost one-third are aged 75 or over.

It seems likely, therefore, that, as the years go by and as the mass of young patients admitted in the 1920s and 1930s become elderly and die, the total number of patients in hospital will fall. This group of young and middle-aged patients is not being replaced. The number of patients still in hospital five years after admission has already shown a fall from an average of 60 from each year's intake 30 years ago to 23 for the admissions of 1953. The continued trend since then towards an older chronic population and the effects of the phenothiazine drugs would lead one quite reasonably to expect, therefore, that, even with no further advantages in treatment and no further changes in policy, beds will eventually only be needed for about one-third of the chronic population which we have at present. Many of the developments in the field of mental health that are being discussed at present will, if they are brought to fruition, further reduce the chronic population.

I have tried to form an estimate of how the number of female beds is likely to fall in the next 30 years, but the calculations are hazardous and rest on a large number of assumptions, which ignore the effects of any

of the changes in policy described above. The first is that the numbers admitted in future years will be the same as in 1957; in other words, no allowance is made for the effect on numbers of admissions of the increase in numbers of the population and the greater number of old people in it. The second assumption is that the discharges of future patients will follow recent experience. Thirdly, it is assumed that the expectation of life of those who will never be discharged is that of the general female population. There are, however, good reasons for supposing that their expectation of life is lower (Norris, 1959). Indeed, the "excess mortality" of mental hospital patients is much larger in the case of younger and middle-aged patients than of elderly patients—so much so that a prediction based solely on the ordinary expectation of life of the population in hospital on December 31, 1959, leads to the obviously unlikely conclusion that the number of patients remaining in five and ten years' time will actually increase.

In calculating the likely future population, therefore, I have used two methods. For those admitted in 1953 and before, I have projected the actual curves of discharge and death of these patients since that time (Fig. 8). These curves may be expected to meet at

FIG. 8.—(A) Patients admitted before 1954: discharges and deaths 1954-9 and projection. (B) Admissions of 1957 still in hospital after two years. Projection of deaths based on expectation of life derived from age distribution (smoothed). Projection of discharges based on experience from 1949-50 and 1953 admissions.

about the year 2000, as the youngest patients in this group may be expected to die at about that time. For those admitted since 1953, with their high proportion of the elderly who stay more than two years, the "excess mortality" may well not be very great (Norris, 1959), and I have based the prediction upon the ordinary expectation of life. The error of this method in all probability leads to too high an estimate for the future hospital population, but how much too high I am unable to guess. One major difficulty in using an expectation-of-life method based on age was that I had to try to decide which patients were likely to be ultimately discharged so that I could know the ages of the remainder. I based these judgments on the patients' actual diagnoses and histories, and made use of information derived from the 1949-50 and the 1953 admissions to try to decide which actual patients were likely to leave after a spell of more than two years in hospital.

The predictions are contained in Fig. 8. This conservative estimate shows that *without any change in policy*, but, on the other hand, without allowing for a bigger population, total numbers may be expected to decrease by nearly 30% in 20 years, and that by then 38% of the patients will have come into hospital less than two years previously (compared with 27% now).

It has been estimated that up to 40% of the present population of this mental hospital would not need to remain here if there were alternative accommodation for many of the elderly and of the chronic mildly psychotic patients, and if welfare facilities were developed to enable others to live satisfactorily at home. If one assumes that 30% is a realistic figure for the reduction in total beds which developments of this kind will achieve in the next 20 years, the number of female beds needed then will be reduced to 592. If, in addition, beds are provided elsewhere, in psychiatric units attached to general hospitals and in medium-stay units for those whose illnesses last up to two years, a further reduction of 318 can be expected, leaving a long-term female population in 20 years' time of 274—less than a quarter of the present figure.

There can be many opinions about where psychiatric patients can best be treated, and about the load of mentally abnormal people which the community can be reasonably expected to bear in its midst; but there will be few who will mourn the disappearance of the vast mental hospital bequeathed to us by our grandparents.

Summary

This paper reports on the number, age, diagnosis, duration of stay, and outcome of all *female* admissions to one large mental hospital in the years 1928-30, 1934-6, 1949-50, 1953, and 1957.

The number admitted has risen fourfold and first admissions have risen threefold in 30 years, but the population at risk has only increased by one-third. Readmissions now form over half, instead of one-third, of the total admissions.

Over a quarter of those admitted are 65 years old or more, and one-twelfth are 75 years old or more.

Admissions for neurosis, personality disorder, and reactive depression have increased greatly and now form one-sixth of the total.

Three-quarters of those admitted in 1957 had been discharged within six months.

Although admissions for *schizophrenia* have increased threefold, this is wholly attributable to a rise in readmissions. The median length of stay of those ever discharged has fallen from seven months to nine weeks. Death directly from *schizophrenia*, once common, is now very rare.

Admissions for *endogenous depression* and *manic-depressive psychosis* have increased sixfold and first admissions threefold, but again the chief rise has been in readmissions. The median length of stay has fallen from six months to seven weeks; 85% of the admissions of 1957 had been discharged in six months. Admissions for *mania* have fallen.

Patients with *senile* and *arteriosclerotic dementia* account now for one-twelfth of all admissions; more than one-third of these in 1957 were over 80; only 10% are ever discharged.

Dementia has now replaced schizophrenia as the commonest cause of a stay in hospital of more than two years.

The decrease in the number of schizophrenic illnesses becoming chronic may well lead to a fall in the total patient population of 30% over the next 20 years. If, in addition, changes in national policy are effective, mental hospitals may perhaps be reduced to one-quarter of their present size.

I am indebted to the medical superintendents and other staff of 38 hospitals for help in tracing the progress of 124 transferred patients; and to Dr. J. A. Scott, Medical Officer of Health for London, and to the Town Clerk of Lewisham for help in calculating the population at risk.

REFERENCES

- Annual Abstract of Statistics (1958 and 1960). H.M.S.O., London.
 Brill, H., and Patton, R. E. (1957). *Amer. J. Psychiat.*, **114**, 509.
 — (1959). *Ibid.*, **116**, 495.
 Kay, D. (1959). *Proc. roy. Soc. Med.*, **52**, 791.
 Kramer, M., and Pollack, E. S. (1958). *Amer. J. publ. Hlth*, **48**, 1003.
 Norris, V. (1959). *Mental Illness in London*. Maudsley Monograph.
 Roth, M. (1960). *Brit. med. J.*, **1**, 1226.
 Shepherd, M. (1957). *A Study of the Major Psychoses in an English County*, Maudsley Monograph. Chapman and Hall, London.

MULTIPLE-PUNCTURE VACCINATION WITH FREEZE-DRIED B.C.G. VACCINE IN SCHOOLCHILDREN

BY

MARGARET I. GRIFFITHS, M.D., M.R.C.P.
D.C.H.

Department of Child Health, University of Manchester

T. W. BRINDLE, M.B., Ch.B., D.P.H.

E. H. GORDON, M.D., D.P.H.

T. HOLME, M.B., Ch.B., D.P.H.
Divisional Medical Officers

AND

BARBARA JONES, M.B., Ch.B.

Assistant County Medical Officer, Cheshire County Council

The value of B.C.G. vaccination of schoolchildren in this country in the prevention of tuberculosis has been sufficiently substantiated (Medical Research Council, 1956, 1959; Pollock, 1959; Springett, 1959) for it to require no further advocacy. There still remains, however, the problem of how it can be most effectively, rapidly, and economically administered to children, not only in this country but in those overseas countries with greater problems of tuberculosis control, expanding populations, hot climate, and insufficiency of public health personnel. For these countries a heat-stable freeze-dried vaccine which can be easily and efficiently administered would seem to provide the answer.

A freeze-dried vaccine for intradermal use has been prepared and used in Great Britain for several years, and reports on its efficiency in schoolchildren have been made by the Medical Research Council (1958) and by Alston *et al.* (1958). Although, in the strength issued at the time, the freeze-dried vaccine was slightly less effective than the fresh Danish, a slight increase in the bacterial content has eliminated this difference, and the advantages inherent in a freeze-dried vaccine have led to its widespread use.

Recently a stronger freeze-dried vaccine for multiple-puncture vaccination has been available, and reports on its use in schoolchildren have been published from Cardiff and Pembroke (Griffith, 1959) and from Rotherham (Hopper, 1960).

In February, 1959, a trial of this method of vaccination was initiated in four health divisions in north-east Cheshire. The aim of this trial was (a) to compare the results of multiple-puncture with intradermal vaccination, and (b) to make an attempt to assess some of the factors which influence the efficiency of multiple-puncture vaccination and thus to improve the technique or vaccine to such an extent that the degree of local reaction and allergy produced will compare favourably with those from intradermal vaccination.

First Trial (School Year 1958-9)

The object of this trial was to compare the effects of vaccine strength of 83 mg./ml. given by multiple puncture, using 20 needles at depths of 2 or 3 mm., with that produced by an intradermal vaccine of a strength of 500,000 viable organisms per dose.

Method.—Preliminary testing was performed with 10 T.U. of old tuberculin intradermally in the left forearm. Of 1,099 children tested, 791 had negative reactions (less than 5 mm. induration), and these children were vaccinated. Vaccination either by the intradermal route or by multiple puncture at a depth of 2 or 3 mm. was performed in strict rotation, the three groups being equally rotated. For the intradermal route the skin in the right deltoid region was cleaned with ether, and 0.1 ml. of vaccine, prepared by adding 1 ml. of sterile water to each ampoule of dried vaccine, was given intradermally. For the multiple-puncture

FIG. 1.—Left: Type A gun set to fire 20 needles at a depth of 2 mm. Right: Type B gun set to fire 20 needles at a depth of 2 mm.