THE MENTAL SYMPTOMS ASSOCIATED WITH 58 CASES OF CEREBRAL TUMOUR.

By

LOUIS MINSKI, MAUDSLEY HOSPITAL, LONDON.

In this paper a study of the mental symptoms found in cases of cerebral tumour was undertaken, and an attempt made to assess their value, if any, in the localization of the tumours. Concurrently with these symptoms, the presence or absence of physical signs was noted with a view to helping in localization.

The type of case admitted to the Maudsley Hospital must obviously differ from that referred to a general or neurological hospital, as those showing neurological signs only, or signs combined with very slight mental disturbance, would be referred to the latter, whereas those with marked mental disturbance would be referred to the Maudsley Hospital. Many cases suffering from aphasia were sent here as suffering from mental disorder, the apparently rambling and disconnected talk of the aphasic patient having been interpreted as gross mental disturbance.

In order to compare the cases admitted to the two types of hospital, the records of a similar number of cases of cerebral tumour admitted to the Maida Vale Hospital were examined, and the comparisons will be given later.

Fifty-eight patients were examined. The localization of the tumours can be tabulated as follows:—

Left side	Right side	Mid-line or posterior fossa
22 frontal	4 frontal	5 posterior fossa
12 temporal	3 temporal	2 corpus callosum
4 parietal	3 parietal	1 pineal
—	1 motor area	1 thalamus
—	—	—
38	11	9
—	—	—

It will be seen that of the 58, 49 (or 84 per cent.) were in the cerebrum, and only 5, or 9 per cent. were subtentorial. This would suggest that mental symptoms are associated much less frequently with subtentorial growths,

which were referred on account of the predominance of neurological signs to other hospitals. Mental changes were not observed until the intracranial tension increased sufficiently to produce somnolence and apathy, which progressed to coma. Thirty-eight were on the left side; it would appear that mental changes are more common with left-sided growths than those on the right side. Kolodny¹ appears to think they are commoner in left-sided tumours as a result of the associated speech disturbances. He states that as speech depends on visual and auditory impressions, it follows that if these are not fully understood they will not be so well retained, and thus memory impairment occurs. It may well be that detailed psychiatric examination is extremely difficult in aphasic patients and that an apparent memory defect is present as a result. There does not appear to be any doubt, however, that in all cases presenting aphasia there appears to be some reduction of intellectual capacity per se.

That mental symptoms are more common with cortical lesions will also be agreed, and when they occur with tumours in other situations they appear to be the result of increased intracranial pressure.

STRESS.

In all patients admitted with organic lesions, a detailed history was taken as in ordinary psychiatric cases, and an interesting point emerged, viz. that in many cases the relatives described the change following physical or mental stress.

Of the 58 cases examined, 19 were definitely (according to the history) associated with the following types of stress:—

Accident	...	...	...	...	...	...	...	4
Unemployment	...	...	...	...	...	...	...	2
Financial worry	...	...	...	...	...	...	...	2
Illness and deaths of relatives	...	...	...	...	...	...	...	3
Dermatitis, influenza, pregnancy	...	...	...	...	...	...	...	3
Overwork, love affairs and religious worry	...	...	...	...	...	...	...	5

It may be argued that the stress first caused the symptoms, which were already present, to be noticed, and this may hold good in some cases; but in others, however, close questioning elicited the fact that no change was noticed previously to the stress.

Thus one man, previously in good health, who worked as a guard on the underground, saw a girl attempting to board a moving train, and she slipped between it and the platform. He rushed to help her, and she regained the platform unhurt. He was very much shaken by the incident, but managed to finish his day's work. On returning home he attempted to write a letter to his brother, but was unable to do so as his hand felt weak (he was right-handed). The next day his right arm and leg were paralysed, and he became

aphasic. He was admitted to hospital but became comatose and died. Post-mortem examination revealed a glioma with a recent hæmorrhage into it.

In another case the patient sustained an injury to his arm and began to worry lest he should become paralyzed like his father. He became depressed, and attempted to commit suicide. His illness was noted by his friends as dating from this accident, prior to which he had been quite well. Post-mortem a tumour of the corpus callosum was found.

In all the other cases where stress appeared to determine the illness, the history given was like that already described (the latter), the onset and progress being insidious, as opposed to the first one, where the symptoms appeared in a dramatic and sudden manner. The part played by the stress, if any, will be discussed later in the paper.

MENTAL CHANGES.

For the purposes of description the mental changes have been divided into four groups; but it is obvious in most cases that groups I and II cannot be absolutely separated, as in group I a mild degree of intellectual impairment was necessarily present and in group II changes in emotional tone were found, although slight.

Group I. Simulating Functional Psychoses.

States of depression	...	...	14
States of excitement	...	...	7
Schizophrenic state	...	...	1
Anxiety state	...	...	1
Obsessional state	...	...	1
Hysteria	...	...	1

Group II. Those with marked organic mental changes without clouding of consciousness 23

Group III. Those with marked organic mental changes with clouding of consciousness 6

Group IV. Hallucinations (without other psychotic manifestations) 4

GROUP I.—1. STATES OF DEPRESSION.—The localization of the tumours in this group was as follows:—

Right temporal	...	...	2
Left frontal	...	...	8
Right frontal	...	...	1
Corpus callosum	...	...	1
Cerebellum	...	...	1
Right motor area	...	...	1

It will be seen that the distribution of the growths varied considerably, and that nine out of the 14 were in the frontal lobe (eight, left; and one, right).

An interesting point is, that all these patients had long histories before admission, the average length of illness being five years, the longest being 12 years and the shortest one and a half years. Six of the patients showed typical depressive states, indistinguishable from an ordinary reactive depression without any intellectual impairment whatever. Thus one patient, age 64, became agitated, depressed and worried. He was self-reproachful, had ideas of reference, heard accusatory voices and thought he was to be killed. Memory and orientation were good. He showed no physical signs, localizing or general. He eventually died, and post-mortem a right temporal lobe tumour was found.

Another patient, age 64, who had an attack of depression 25 years ago from which he completely recovered, became depressed, restless and agitated. He was self-reproachful over imaginary wrongs and expressed persecutory ideas. Consciousness was clear and no physical signs were present. This depression followed a recurrence of a thyroid carcinoma removed by operation. The patient died, and a secondary deposit was found in the right temporal lobe.

These are two typical instances of depressive attacks occurring with cerebral tumour.

The other eight patients did not show such typical states as the above, but rather tended to show an exaggeration of their normal depressive tendencies. All these patients were described by their relatives as being of a quiet disposition, somewhat anxious, pessimistic in outlook and inclined to worry.

An interesting case in this group was that of a schoolmaster of education, who had always shown homosexual characteristics in his 'make-up.' He avoided women, preferred men's company, and had always taken interest in boys' figures and masturbation. In addition he had always been preoccupied with his bowels, and on his marriage, late in life, there were sexual difficulties and no relations with his wife. He developed a slow-growing astrocytoma of the left frontal lobe and gradually became more overt in his homosexual practices. He talked openly of sodomy, masturbated freely with boys, and became addicted to bouts of drunkenness. He clamoured for homosexual relations and eventually projected these on to his environment and accused people of practising homosexuality and of keeping boys in the ward for that purpose.

The marked feature in all these cases was the gradual increase in the depressive tendencies already noted in the patients' 'make-up.' They tended to become anxious and apprehensive, were extremely introspective and worried about their bodily health, and in some cases, became self-absorbed and apathetic, whilst in others they were agitated, fidgety and restless.

2. STATES OF EXCITEMENT.—Of the seven patients showing excitement, these had all been described by their relatives as being of a jolly disposition,

looking on the bright side of life and always fond of a joke. The distribution of the tumours was as follows:—

Left frontal	...	...	...	3
Right frontal	...	...	...	2
Left temporal	...	...	...	2

After the development of the tumour, these patients showed a gradual increase in their normal tendencies. They became facetious; treated their illness with undue levity; joked and punned and were amused at any trivial occurrence. They showed no insight into the severity of their condition but were elated and definitely euphoric, stating they had never felt better.

This state, sometimes called 'moria,' sometimes 'Witzelsucht,' which has been ascribed by some writers to lesions of the frontal lobes, appears to depend on the patients' 'make-up' rather than on any particular situation of the tumour.

One patient in this group was of particular interest, in that slight changes in his personality had been noted over 18 months, but nothing definite was seen until three weeks before admission, when he became extravagant, embarked on wild schemes, bought villas and lost all his money. On examination he was aphasic; his memory was grossly impaired and he was disorientated. There were no physical signs except aphasia. His case appeared to be an organic one with expansive changes.

Spinal fluid examination showed:—Lange 5555432110; protein .110 mgm.; cells 2 per c.mm.; Wassermann reaction, negative.

The patient died, and post-mortem a left temporal growth was found.

In all the cases in this group the chief change was the increase in tendencies already present, with some slight intellectual impairment. This type of change appears to occur in slow-growing tumours, and to be independent of the situation of the tumour. Emotional lability was noted, although the mood seemed fairly constant, and showed slight and short variations similar to those occurring in ordinary manic states.

3. THE SCHIZOPHRENIC REACTION was seen in a patient with a pineal tumour. She had shown physical signs suggestive of pineal tumour for some four years, but no mental dysfunction until a few days before admission here. She then was excited, restless, noisy and impulsive. She talked in a disjointed manner; grimaced; was negativistic and resistive. In addition she was aurally hallucinated.

After four months she recovered completely, and showed complete mental normality, but physical signs such as optic atrophy, sluggish pupils, defective upward and downward movement of the eyes, etc., persisted. Handley² states that confusion and agitation associated with hallucinations are found with pineal tumours, but it seems more probable in this case that the schizophrenic illness was purely intercurrent, and occurred in a patient

with a pineal tumour; upon it the latter had no bearing. About 18 months after leaving the hospital, the patient remains well mentally.

4. THE ANXIETY STATE occurred in a woman of 45 who had an attack of anxiety about the age of 20, from which she recovered, and who remained quite well until the air raids of the War. She then became apprehensive and jumpy, and began to sleep badly. At the same time her brother died and there was a marked increase in the symptoms. She was somewhat depressed, felt anxious and afraid of something indefinite. At times she was giddy, had marked anxiety dreams about being chased and murdered, and sweated profusely. Tachycardia was present, exaggerated deep reflexes and some enlargement of the thyroid also. There was no impairment of memory, and neurological signs were absent. These symptoms persisted, and post-mortem examination showed a right frontal growth.

5. OBSESSIONAL FEATURES occurred in a patient of 55 who began to have generalized convulsions, and who, just preceding the fit, had to count five, while the head felt as if it were being twisted round. There were no obsessive features in the personality previously, and none were found between the attacks. No physical signs were present. The patient died from a left frontal growth.

6. HYSTERICAL FEATURES occurred in a girl of 23 who had previously been in good health, and shown no neurotic traits except somnambulism. Six weeks prior to her illness her family made her break off her engagement against her wish, and this upset her considerably. She became mildly depressed and apathetic, refused food and suffered from anorexia and vomiting. There was no impairment of memory but vague physical signs were present. The day after admission patient became unconscious and died. Post-mortem a large glioma of the right parietal lobe was found.

GROUP II.—THOSE WITH MARKED ORGANIC MENTAL CHANGES WITHOUT CLOUDING OF CONSCIOUSNESS.—In this group there were 23 patients with tumours localized as follows:—

Left frontal	...	...	...	9
„ temporal	...	...	...	7
„ parietal	...	...	...	4
Right parietal	...	...	...	1
„ temporal	...	...	...	1
Thalamic	...	...	...	1

It will be seen that left-sided tumours predominated, viz., 20 out of 23, and of these nine were frontal and seven temporal.

The average history given was shorter than in the 'functional' group already described, but longer than in the delirious group. An early feature was irritability with easy fatigability. The former appeared to be due to the failure in memory and the associated difficulty in coping with daily

routine matters. The fatigability was marked in testing memory, where in the early stages of the examination answers were given correctly and fairly rapidly, but as it proceeded they were given only after long intervals, and were often incorrect. Memory showed the usual impairment noted in all organic brain diseases. Recent impressions were lost first (retention) and in the later stages remote memory was impaired also. Confabulations, used to fill in the gaps in memory, were uncommon in this series and were only noted in one patient with a right temporal tumour. The intellectual functions at the same time became disturbed; thus judgment, discrimination and the critical faculty were markedly impaired. Coincidentally, speech became slower and retarded, and in some cases the patient broke off in the middle of sentences owing to his inability to concentrate and his forgetting what he was saying. Perseveration was present in 12 patients with left frontal (7), left temporal (4) and left parietal (1) tumours. Orientation became disturbed in the later stages, firstly in time and space and finally for self. Coupled with the irritability, impatience, querulousness and outbursts of anger were sometimes present and restlessness was marked.

As the intracranial pressure increased, the patients passed into a somnolent apathetic state from which they could be roused and made to eat, and answer questions appropriately, although slowly. Marked variability is often present in this state, at one time the patient being somnolent and difficult to rouse, and at another, alert and well in touch with his surroundings. Emotional lability is often marked, the patient passing very readily from laughter to tears and with very little causation.

As the somnolence increased, external stimuli passed unnoticed, the patient having to be repeatedly urged to carry out any act; in this stage, incontinence of urine and faeces was common. Carelessness and self-neglect became very marked in the later stages.

GROUP III.—THOSE WITH MARKED ORGANIC MENTAL CHANGES WITH CLOUDING OF CONSCIOUSNESS.—Six patients presented symptoms as above. The localization of the tumours was as follows:—

Left temporal ...	...	...	3
„ frontal ...	...	...	1
Corpus callosum ...	...	...	1
Right parietal ...	...	...	1

All these patients gave comparatively short histories, viz., from six weeks to 12 months, the average being six months. Their illnesses were typical confusional states, and in the main were as follows.

They were completely disorientated; their memories were grossly impaired; conversation was rambling and incoherent. Identities were mistaken. They were noisy, restless and excited and showed great variability in their mood. At times they were suspicious and querulous, at

others depressed and apprehensive, whilst at others they were laughing and playful.

They expressed fleeting and ever changing delusions, e.g. that their spouses were unfaithful—that they were married to the doctors—that their food was being poisoned, etc. Hallucinations of both sight and hearing were present in all cases; the former took the form of flames and flashes, animals, costermongers, grotesque figures. The latter comprised bells, voices, bangs and shots. One patient (left temporal) in addition complained of a bad smell. Incontinence of both urine and faeces was common; and some were resistive over food, requiring to be fed.

Five of these patients showed physical signs of cerebral tumour; in one (left temporal) they were absent. The patients were all over 45 years of age, and all died within a short period of admission, the tumours being verified post-mortem.

GROUP IV.—HALLUCINATIONS.—Under this heading are described those cases in which no psychotic phenomena, except hallucinations, were found, in spite of careful clinical examination. Those patients with clouding of consciousness showed visual and auditory hallucinations and some of the depressive ones auditory and olfactory hallucinations.

Two patients with left frontal tumours in a setting of clear consciousness smelt a bad smell all day, as did one other patient with a left temporal tumour (without any other psychotic symptoms being noted). One patient with a tumour of the corpus callosum, extending into the præcuneus, saw figures of unknown men and women moving across the visual fields with her eyes closed, but not when they were open. No other patients with hallucinations as isolated mental symptoms were found in the present series.

APHASIA.

Twenty-three of the patients showed some degree of aphasia on admission, and in all cases the aphasia was a combination of motor and sensory varieties. It varied from a mild degree where the patient used a wrong word occasionally, and recognized the fact, to an unintelligible jargon, when newly coined words were used and the conversation was a mere incoherent hotch-potch. It was the latter type of patients who were described by their own doctors as being 'mental,' and whose condition was not recognized as a true aphasia. In most cases the aphasia was increased by emotional upset such as excitement of any kind, and in a few cases was present only preceding or following a generalized convulsion.

It is a debatable point whether the intellect is impaired in aphasia. Many writers state that aphasic symptoms are due to intellectual impairment, as in some cases of severe dementia aphasia is not present, and in some cases of aphasia little intellectual impairment can be found. Marie³ affirms that

inability to understand impressions, or to interpret read or spoken thoughts, must be looked upon as intellectual impairment. It is often advanced, however, that there is frequently no proportional relation between the severe aberrations of judgement, attention and memory on the one hand, and the aphasia on the other; and conversely, between the considerable aphasic disturbances and the intellectual defect.

The investigation of the intelligence of aphasic patients is extremely difficult, but probably with aphasic disturbances intellectual impairment in some degree occurs as well.

FITS.

Twenty-four of the patients admitted gave a history of fits.

Left Frontal—11.—Four of these were described as ‘fainting attacks’ in which the patient became pale and pulseless without loss of consciousness. The patients were giddy and were said to ‘lose themselves,’ i.e., to lose the thread of the conversation momentarily. These appeared to be similar in some respects to petit mal, and after the attack the patient for a short time had difficulty in getting out his words and appeared to be dazed. In the remaining cases, in the earlier stages, the relatives described the patient as having attacks similar to the above, in which he ‘lost himself’ and forgot what he was doing. In the later stages the fits took the form of generalized convulsions with loss of consciousness. In no case was a cry noted, and in only two was the tongue bitten. Incontinence of urine occurred in all, but in none was a history of incontinence of fæces obtained. The duration of the fits varied from two minutes to two hours, the average being roughly 15 minutes. Tonic and clonic stages were well marked and conjugate deviation of the eyes was present in three cases. After the attacks, three patients had difficulty in getting their words out, and were unable to articulate distinctly; one had a period of amnesia lasting from two to three hours, and another had a temporary paresis of the right leg with an extensor plantar response.

Left Temporal—5.—One patient had attacks which started in the right hand and spread up the arm, consciousness then being lost. The right leg was then drawn up and the cheeks blown out. These attacks lasted five minutes, and afterwards he was able to continue his work and felt no ill effects.

Another patient had ‘turns’ lasting ten minutes, during which headache became very severe, and he was unable to speak. They recurred with great frequency but left no ill effects after they had passed off. Another patient had attacks characterized by weakness of the right hand and inability to find the right word. They lasted a few minutes and there was no loss of consciousness. Another patient had attacks of generalized shivering with no loss of consciousness. One patient had typical epileptic seizures which were treated as idiopathic epilepsy for some time.

Left Parietal—4.—One patient had a generalized convulsion with loss of consciousness, lasting ten minutes, this being preceded by black spots in front of the eyes. Another had a sensory Jacksonian fit beginning in the right fingers and showing the definite march up the arm and down side, thigh, leg and foot. Twitching then began in the toes and the patient felt as if someone was pushing her and she fell unconscious to the ground. She remained unconscious for 30 minutes. One patient had fainting attacks similar to those described under the heading of frontal tumours, and one had screaming attacks resembling an acute anxiety attack, in which he felt 'something jump from his ankle to his shoulder' and felt he was going to die.

Right Frontal—2.—One patient had attacks two to three times a day in which the face went blue and he trembled; there was a feeling of nausea and generalized trembling. The attack was only momentary and consciousness was not lost. The other patient had generalized convulsions indistinguishable from the major attacks of idiopathic epilepsy.

Corpus Callosum—1.—This patient had attacks lasting two days and at intervals of two weeks, in which there were headache, vomiting and giddiness, and pseudo-hallucinations of unknown figures seen only when the eyes were closed.

Cerebellar—1.—This patient had attacks in which the face blanched, and then the whole body rotated in a laying position with extraordinary rapidity from right to left, and ended in a semiprone position. The right upper limb was semi-flexed and a few clonic spasms occurred. The whole trunk and limbs then became flaccid and consciousness was lost. The sphincters were not relaxed and the eyes were directed downwards with the visual axes parallel. These attacks lasted three minutes, and were followed by periods of transient confusion lasting some hours. Following on the confusion were periods of depression with marked suicidal tendencies.

INCONTINENCE OF URINE AND FÆCES.

Incontinence of urine and fæces occurred in nine patients as follows:—

Left frontal	...	...	...	5
„ temporal	...	...	...	2
„ parietal	...	...	...	1
Right frontal	...	...	...	1

Incontinence of urine only occurred in:—

Left frontal	...	...	...	7
Right frontal	...	...	...	1
Left temporal	...	...	...	1
Right parietal	...	...	...	1

Incontinence of fæces only did not occur in any case.

Patients who showing clouding of consciousness, or were comatose, were excluded, as incontinence might obviously occur independently of the situation of the tumour.

In all the above cases the patients realized they had been incontinent and were quite indifferent to the fact. They were conscious of the stimulus but owing to their apathy did not make any attempt to control their sphincters.

OTHER PHYSICAL SIGNS.

Twenty-two patients of the 58 showed localizing signs, 24 showed vague neurological signs and in 12 physical signs were completely absent on admission.

Papilloedema was present in 35 of the patients on admission and was equal on the two sides in 23, was greater on the side of the lesion in five, and greater on the side opposite the lesion in seven.

An analysis of the headache, vomiting and papilloedema showed that in eight cases (two left frontal, one left temporal, two right temporal, one callosal, one cerebellar, and one right rolandic) none of these was present at any time.

DISCUSSION.

Stress.—One method by means of which stress can produce symptoms appears to be as follows. As is well known, sudden emotional disturbance causes a rise in blood-pressure, and this may be sufficiently high to cause one of the newly formed weak-walled vessels in the growth to give way, producing marked symptoms suddenly, or an increase in those already present. In those cases where slight symptoms are already present but are not recognized by patient or relatives, stress may possibly operate in the following manner. It is known that a psychological stimulus in the form of emotion may cause physiological disturbance. This is seen in the increase of spasticity in disseminated sclerosis and of the tremor and akinesia in encephalitis under intense emotional upset. The psychological stimulus may also act in this manner in cerebral tumours, thus causing the symptoms to be noticed objectively. Lastly, the organic lesion already present must necessarily make the patient's power of adaptability to any additional worry or shock less than normal, and provided he can carry on with his daily routine without undue stress nothing abnormal is noted. As soon, however, as he has to face any additional stress, he is unable to cope with it, and symptoms become more pronounced in that he is unable to carry on with his daily duties, which previously he did quite well.

Personality Changes.—In the patients with slow-growing tumours, irrespective of their localization, it has been shown that an increase in preformed personality characteristics was marked and intellectual disturb-

ances slight. It would appear then, that there is a release of these tendencies, or that the normal inhibition is removed. Attempting to describe this on Hughlings Jackson's principles it might be suggested that these are positive release symptoms comparable to positive neurological release symptoms such as fits, spasticity, etc.; the negative mental symptoms—memory impairment, defect of attention, etc.—corresponding to negative neurological symptoms such as paralysis, anæsthesia, etc.

Byrom Bramwell⁴ in 1888 described the mental changes associated with cerebral tumours in this manner. He includes among the positive symptoms 'irritability and unevenness of temper, crossness, oddness of manner and address, etc.,' and the negative symptoms 'intellectual impairment, loss of memory, want of attention, loss of power of mental application, etc.' Gordon Holmes⁵ states that both depression and euphoria may be found in frontal lobe tumours, the former with incontinence, drowsiness and stupor, and the latter with restlessness, exuberance, childishness and facetiousness. Here again it would appear that the emotional tone depends on the previous personality of the patient.

Henry⁶, in the most recent article on this subject, appears to think that in all cases of cerebral tumour the first prevailing mood is depression, due to consciousness of failing ability to work and cope with things in general. The next change, according to him, is one of euphoria, which is a means of escape from suffering, or other avenues of escape are provided by a delirious reaction or somnolent state. In the present series, although variability of mood was found, the patient was either predominantly euphoric or depressed from the beginning of the illness. In those cases showing euphoria there was no initial period of depression; hence it would appear that the mood depended on the previous 'make-up' of the patient, and not on his reaction to the physical illness. In no case was there a striking change from a depressive to a euphoric state as the disease progressed.

Kolodny⁷ found that changes in personality were present in 21 per cent. of temporal tumours as against 5 per cent. of frontal tumours. In this series, of the 21 cases showing personality changes, 14 were frontal (54 per cent. of the frontal tumours examined) and four were temporal (27 per cent. of the temporal tumours). Localization would appear, therefore, to have little bearing on these changes; rather, as already stated, the tumour tends to release preformed tendencies.

Depressive states were commoner in this series, and this is in keeping with the general admissions to the Maudsley Hospital, in that depressive states are much commoner than manic ones.

Intellectual Impairment, etc.—Kolodny states that 19 of 38 cases of temporal tumour showed mental impairment and only 13 of 30 frontal. In this series nine frontal and seven temporal showed mental deterioration in a setting of clear consciousness, i.e. 35 per cent. and 46 per cent. respectively.

It seems, however, that these changes depend rather on the rate of growth than on the site. The slowly growing ones produce personality changes, and the more rapidly growing ones the changes in the intellectual sphere.

It may be that some disturbance in the circulation of the cerebrospinal fluid causes the symptoms, and in the former there is time for the circulation to adjust itself, whereas in the latter there is not.

General Neurological Signs.—A striking fact was the paucity of physical signs in many of the cases admitted. Twelve showed no physical signs, 24 showed only vague ones and only 22 (38 per cent.) showed localizing signs. Comparing this with cases admitted to Maida Vale, 36 were cerebral and 19 subtentorial in contrast to 49 cerebral and 5 subtentorial admitted to the Maudsley. There was no great discrepancy in generalized signs, but localizing signs were very much commoner. Thus, 51 showed localizing signs, in seven they were vague, and in none absent.

Three cases were hallucinated; in two of these visual hallucinations were present in a hemianopic field, and in the third (a case of cerebellar tumour) flashes of light occurred.

Twenty-three of the patients admitted to the Maudsley showed aphasia, and only 12 of those admitted to Maida Vale. Only 10 of those admitted to Maida Vale showed mental symptoms and then only mild depression, impairment of memory, irritability, or visual hallucinations in a hemianopic field; and none simulated functional states such as is the case in the present series. One patient with a right frontal tumour was cheerful and jocose and was said to have always been so, and another who was always suspicious and jealous had shown an increase in these tendencies since the development of a left middle fossa tumour.

SUMMARY AND CONCLUSIONS.

1. Mental symptoms in cerebral tumour do not appear to depend on localization, but rather on the rate of growth of the tumour and the previous personality of the patient.
2. Mental symptoms occur more commonly with cerebral tumours (more with left- than right-sided ones), as, of the 58 examined, 49 were cerebral and only five subtentorial. All the former showed mental symptoms and only one of the latter.
3. In slow-growing tumours personality changes predominate, the mood depending on the release of preformed tendencies. In this series, 14 of 58 examined were depressive and seven manic.
4. In rapidly growing tumours changes in the intellectual sphere are marked and personality changes slight, while in the more rapidly growing tumours intellectual disturbances with clouded consciousness are found. In the former group were 23, and in the latter six,

5. Twenty-five cases showed reactions simulating functional psychoses, and in 12 of these physical signs were absent.

6. Physical signs are less common in patients admitted to a hospital of the Maudsley type than in patients admitted to a neurological hospital, whilst aphasia is commoner in patients seen in the former.

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