Thesis on Intra cranial
Tumours & their treatment
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Intracranial Tumours & their Treatment.

§1. Probable cause.

The cause of intracranial tumours cannot be definitely assigned. The fact that they occur in males with far greater frequency than in females, probably in the proportion of three to one justifies the view ordinarily accepted that injury to the head, to which men are obviously more liable than women, is the initiative cause, evidence in favour of this view is given by W Hale White (B. M. J. March 14. 1896) Dr Lunn (B. M. J. Nov 16 1895) Dr Ballance Blu J. March 14. 1903)

It is maintained by Dr Ferrier (B M J. March 14 1903). that in many cases trauma is the only cause, with this view however Dr Hale White & others are unable to concur. My own reading & experience would seem to justify the belief that in many cases injury is the only direct cognisable cause.

Further, it may be safely affirmed that any kind of psychic strain may excite its growth, in as much as

this would involve a disturbance of the circulation & nutrition of the cerebral regions

II Character of Growth

An examination of statistics proves that tumours are in the main of a tubercular character, It was found that out of a hundred successive cases of intracranial tumour examined in the post mortem theatre of Guy's Hospital nearly one half were tubercular, The following analysis of the cases shows the varied characte of the growth & the comparative frequency with which each type occurs

Tubercular	45
Glioma	24
Sarcoma	10
Carcinoma	5
Gliosarcoma	2
Cyst	4
Gumma	5
Lymphoma	1
Myxoma	1

doubtful in 3 cases.
The most noticeable feature in the above list is the predominence of tubercular tumours. It is rarely however that tubercular intracranial tumours are primary, They are mostly secondary either to pulmonary tuberculosis or to tubercular affections in some other organs, consistently with this fact it was found that of the above 45 cases of tubercular tumour 24, that is more than half, occurred in children under ten years of age. According to Sougues & Charcot the most frequent seat of tubercular disease is the lower Rolandic area & its partiality for this region is probably due to its relative richness of circulation consequently upon its deriving blood from the Sylvian & Anterior cerebral arteries. It is interesting to note that the proportion of syphilitic tumours shown in the above analysis agrees with the result of an examination of 500 cases collected by

Dr Allan Starr

... III Surgical treatment

There are, doubtless, cases on record in which surgical operation has achieved brilliant results in the successful & complete removal of intracranial tumours, The number of such cases is unfortunately very small. They contribute so small a proportion of the total number of cases that one is almost justified in treating them as surgical curiosities. Of 45 cases of intracranial tumours collected in five years by Dr Byron Bramwell thirteen were subjected to trephining, but in no single instance was the tumour successfully removed.

A study of the conditions necessary to a successful surgical interference will account for the extreme rarity with which such treatment is successfully performed.

IV Conditions of successful surgical treatment

Tumours, in order to be amenable to successful surgical treatment must satisfy the following conditions:-

(i) They must give rise to definite localising symptoms indicative of their exact position

(ii) They must be accessible

iii They must be single & of such pathological character as to permit of complete removal. Experience shows that these conditions are present only in a comparatively small proportion of cases. We shall first consider to what extent tumours are found to satisfy the first of these conditions

V Tumours which afford no localising symptoms.

The presence of tumour is often detected by the help of general symptoms such as headache, vomiting, giddiness, double optic neuritis. In the absence of Meningitis, Albuminuria,

Ear disease, lead poisoning &c. The symptoms mentioned distinctly show that an intracranial tumour is present, even though there are no localising symptoms.
Indeed, when tumours occur in the lateral lobe of cerebellum or in the frontal lobes it is generally the case that the symptoms they show are general & have no localising value.
An account of a few notable cases of this kind is subjoined.
Case (a) Prof. Allbut narrates a case of Glioma of the size of a large pigeon's Egg in the left frontal lobe of a middle aged woman. Such a tumour must have been one of long growth; but until a few days before death it gave rise to no symptoms
case (b) The case known as Dr Hoxsis. A woman admitted to Guy's complained only of slight headache on examination optic neuritis was found & cerebral tumour was diagnosed. On admission she was perfectly

intelligent ther eyesight was sound. After admission she was able to assist the Nurses in their work. On a certain day, however, she dropped down dead, & on Post Mortem examination a large Glioma was found in the left frontal lobe.

Case (c). Hun reports a case of one & half years duration which gave no symptoms, post mortem examination revealed a tumour of the size of a small hens Egg in the lower part of frontal lobe.

case (d) A case of a large tumour of cerebellum which caused no local ising symptoms came under the notice of Dr. Hale White, The case proved fatal at Guy's Hospital on January 21. 1894.

It is unnecessary to multiply cases of this kind, in such cases the existence of the tumour produces no impairment of motion or sensation, general or special & no specific mental symptoms.

In some instances the absence of local ising symptoms has been attributed to the setting in of atrophy. Thus a tumour in the occipital lobe or in the path of visual impulses might yield no localising symptoms owing to the presence of optic atrophy which would render it impossible to detect the amblyophia or Hemiopia that should result when a new growth occurs, room for it can be found only in two ways; either by compensatory expression of blood or by atrophy. If a tumour grows slowly brain atrophy may take place as fast as the new growth. The result is that intracranial tension may not be raised. This would be likely to happen in the case of a slowly growing tumour of Centrum ovale. The simultaneous setting in of atrophy would prevent ~~expr~~ intracranial pressure In such cases the cardinal symptoms are either absent or are

so insignificant as to be overlooked
A case of this kind which occurred
in Guy's Report for 1893. deserves
mention, The patient who was oper-
ated on for Carcinoma of breast,
did not for some unexplained reason
recover. After lingering for sever-
al months without showing any
definite symptoms she died. It
was then remembered that previous
to admission she had been subject
to slight headache which was
not deemed serious enough to call
for treatment. An examination
of her brain was then made & an
encapsuled Glioma was found
This was easily shelled out in the
right occipital lobe not projecting
from the brain, but replacing &
absorbing its substance

vi Probable cause of absence of symptoms in tumours specified.
The frontal lobes & lateral cerebella lobes
are the portion of the brain most closely

connected with intellectual operations
Their functions are on this account
less fixed to definite parts of the brain.
For it is known that, whereas the intell
ectual functions are developed late both
in the evolution of the species & the life
of the individual localisation of function
to definite parts is associated with a
long period of evolution & increasing
age of individual.
The function of the frontal & lateral
cerebella lobes being feebly fixed, the
destruction of these parts may give rise
to that most striking fact connected
with cortical injury known as vicar-
ious action, neighbouring parts or
possibly the corresponding part of the
opposite side of the brain will pro
bably take on the function of the parts
destroyed. This is well illustrated in
the following instances
Case (A) Known as the American crow-bar
case. A young man aged 25 was
struck by a bar propelled with its
point, which first entered the left

angle of the jaw, & emerged anterior to the coronal suture, the patient was momentarily stunned & recovered without any defect of motion or sensation except ptosis & loss of vision of left eye, due to the local injury of optic & ocular motor nerves.

Case (B) Dr. Walker of Peterborough reports of a similar case

Case (C) H. Charlton Bastian reports two cases in Germans who after an attack of right hemiplegia & aphasia each of them was for a long time unable to speak English, when they began to speak they used German, probably the uneducated right third frontal convolution took up the work

Prof. Durante insisted on the importance of Anterior frontal lobes in morale of patients & explained the fact of the improvement even after complete extirpation of the affected lobe as a function of compensation which could not have occurred before owing to presence

of tumour, the auditory centre being bilateral the function could readely be compensated the right temporal lobe being wounded the patient lost his hearing on the opposite side, but in a short time he reacquired it almost completely

vii Exceptional cases.

Cases are known where tumours in the frontal & in the cerebellum have yielded symptoms. There is an instance described by Prof Durante in (B.M.J. Nov 17th 1900). A youth 20 years of age, in whom disturbance had existed for a year under the form of convulsions, which occurred three or four times without loss of consciousness & then ceased. The patient came to clinic with right frontal headache, choked discs, vision much reduced, diminution of smell & taste & psychic disturbances. Diagnosis of tumour of right frontal lobe was made,

patient was operated on by osteoperi osteal flap, & tumour which im- plicated the anterior section of lobe in anterior cerebral fossa was re- moved, & patient rapidly recovered from operation, all symptoms were cured except the defect of sight which gradually became worse to total blindness. The symptoms re- curred, & a second operation was made & the tumour was found b larger than before. It was removed in pieces, but the operation had to suspended owing to severe haem orrhage. After three days the tumour was extripated as far as middle fossa, the left ventricle being opened & anterior portion of temporal lobe attacked, there was a free discharge of cerebro-spinal fluid, healing took place by secondary intention, but recurr- ence occured in eight months with identical symptoms & death ensued from coma.

viij Other difficulties in the way of successful surgical treatment.

Besides the absence of localising symptoms the operator has to contend with other difficulties. To begin with, Localising symptoms may be present but may give an erroneous indication of the position of the tumour & so render diagnosis difficult & uncertain. This is illustrated by a case operated on in 1895 at Guy's Hospital. The patient was admitted for loss of sight, severe headache, especially in right occipital region, & numbness of left arm, leg, & side of trunk. There were also occasional twitchings of left arm & leg, & sweating of left side at night. There was tenderness of skull in right occipital region & double optic atrophy was present, no vomiting. Skull was trephined in right occipital parietal region at site of tenderness, there was no evidence of increased intra-

cranial tension, but the bone was not replaced the wound was closed. It is stated that the headache was relieved, but two years later the patient was admitted with well marked Loco-motor-ataxia. In the above case stress was laid on localised tenderness as a valuable guide in diagnosis. In (Brit Feb 2. 1899) a very interesting article is written by Ernest Septimus Reynolds on some uncertainties in diagnosis of cerebral tumour. In the next place exact position of the tumour may be clearly demonstrated by definite & distinct localising symptoms & yet the tumour may defy surgical treatment for one or other of the following obvious reasons:-

(a) It may be situated in an inaccessible position. This is the case with tumours situated in the base of brain & with those which affect the Medulla Oblongata, Middle

Lobe of Cerebellum, Pons, Basal Ganglion, the deep part of Centrum ovale, & the corpus Callosum

(B) It may extend so widely & infiltrate so large an area of brain tissue that complete removal is impossible

(C) It may be malignant or a second ary deposit of Carcinoma or Sarcoma in brain

(D) It may either be multiple or complicated with other tumours in other organs as tubercular intracranial tumours, which is secondary to pulmonary tuberculosis, & Syphilitic intracranial tumours the disease in other organs may contra indicate operation.

(IX) Classification of Symptoms:-

The symptoms of intracranial tumour are divisible into three groups. The first group contain symptoms due to mere pressure of foreign body within the cranial cavity, Second group are symptoms due

to position of tumour localising symptoms, that is, if the tumour is situated in some part of brain which will give rise to localising symptoms

Third group contain those symptoms which are due to the particular variety of tumour that is present. Rapidly growing malignant tumours produce different symptoms from a slowly growing innocent tumour

X First Group of Symptoms

A right understanding of the symptoms which are due to the presence of a foreign body in the intracranial cavity requires a study of the nature of this cavity. The cranium is practically a closed cavity with rigid walls. The result is that the presence of a tumour would press against & disturb the other structures contained in it, especially those with which it is in immediate contact. A General disturbance of function would result both from pressure effects

& from the spread of a the diffuse irritative wave over the whole nervous tissue. The accompanying symptoms as one would expect are not entirely confined to those of a general character, that is, those that indicate that there is a tumour somewhere, Symptoms of a more special & localising character are also produced owing to the effect of the pressure on the parts with which the tumour is in immediate contact. Further, The distribution of pressure is determined in part by the fact that a firm membrane known as tentorium cerebelli divides the cavity into two parts & tumours would therefore exert pressure chiefly on the structures which are situated in the same subcavity, as they; A similar inference follows from the division of the upper cranial cavity into two parts by the falx cerebri.
It must however be borne in mind

in spite of what has been said that tumours in one subcavity are able by indirect means to increase the intracranial pressure generally. The intimate connection between intracranial pressure & the symptoms attending cerebral tumour is shown by the relief afforded by trephining & also by experiments on animals in which somewhat similar symptoms may be produced by increasing the intracranial pressure.

The pressure may be conceived as arising thus in one class of cases where the tumour occludes the channels of communication between the Ventricular septum & the subarachnoid space, it produces a distention of the ventricles by the cerebrospinal fluid secreted by the choroid plexus & since it is probable that the capillary pressure in the choroid plexuses is higher than elsewhere in the

brain, it is clear that the secretion of cerebro spinal fluid may go on until compression of the other cerebro spinal capillaries is produced which results inevitably in cerebral anoemia & atrophy.

The more important of the General symptoms deserve individual notice

(A) Headache:- This is mentioned first because it is the most frequent of all the symptoms. It is due to pressure exerted on the meninges & on the nerves with which it is supplied. It is a symptom that is seldom absent though its severity is very variable The pain is often paroxysmal. With the progress of the disease the paroxysms become more frequent & at last tend to become constant The pain is felt during the night or at waking in the morning. In the latter case if it occurs at waking in the morning it is

often accompanied by vomiting,
The pressure of a tumour on the fifth nerve may also produce neuralgic pains. It is interesting to note that if the headache is confined to a localised area the symptoms come to have a local sing value - showing that the difference between general & local sing symptoms is not absolute.
Headache is one of the earliest symptoms produced by experimental increase of pressure & it often appears to be so in cases of intracranial tumour.
The headache may be most intense over the tumour, but this is exceptional for the headache is usually of a diffuse character owing to the increased intracranial pressure which produces it being unduly distributed. In cerebella tumours the headache may be localised over the tumour because being situated in this case in the

cavity below the tentorium, which is small in size, it becomes directly subjected to any increase of pressure within. Sometimes where the tumour is near the surface of the brain there may be a tender spot on the surface of the skull which may be the source of headache.

(B) Optic Neuritis This is the most important symptom of intracranial tumour from a diagnostic point of view. So frequent is it found in intracranial tumour that if it is well marked, its presence should in the absence of any other cause to which it may be assigned lead us to infer the presence of a tumour. Primary optic neuritis is very rare. The size, locality & nature of the tumour & the degree or variety of optic neuritis are not known to have any relation or influence one on the other. The

only fact in this connection known is that of optic neuritis from cerebral tumour exist in one eye only, it will probably be on the opposite side of tumour. There are only a few cases on record in which optic neuritis was absent in cerebral tumour vide. Clinical Lecture of Hale White.

According to Byron Bramwell optic neuritis is present in 80 per cent of cases

In the great majority of cases it is double & it may be present in a strong degree without diminishing the acuity or range of field of vision. In just one half of cases operated on in Guy's Hospital during the past ten years no complaint of failing sight was made although definite optic neuritis existed.

There are many theories as to the cause of optic neuritis that exist Hughlings Jackson's. Leber &c

It has been suggested that it is part of a general sclerosis starting in other parts of the brain, The view which appears most satisfactory is that it is due directly to increased intracranial pressure; this is borne out by the fact that the optic discs clear almost immediately the increased tension is relieved.
If optic atrophy has set in, it is questionable whether this condition is capable of improvement. Dr Hale White says "If optic atrophy is absolute trephining will not restore the sight" but optic atrophy may appear absolute when it is not really so.

(c) Vomiting This is the next most common symptom, It bears no relation to food, is usually unattended with nausea & commonly the tongue is clean. It may be paroxysmal. This symptom is also due to increased intra-cranial pressure affecting the central vomiting mechanism. But when the tumour is in the posterior fossa, it is due to direct pressure on the medulla oblongata. If the vomiting is very frequent & severe one may infer the presence of a subtentorial tumour or great meningeal irritation

Other symptoms of a general character but of a less important kind than those hitherto mentioned are: Vertigo, a common symptom due to tumour affecting middle lobe of cerebellum or disturbances of cerebral circulation causing increased intra cranial pressure

(d) General Epileptiform convulsions

disturbances of the mental functions and apoplectic attacks

iii The pulse characteristic of intracranial tumours should be slow owing to the increased pressure affecting the intracranial cardiac mechanism

§ xi Secondary group of Symptoms. Localising symptoms. The best instances of symptoms of this class occur when the tumour is situated either in the Rolandic area, the speech centres or in the occipital lobes. Such tumours yield symptoms which are of great value in locating the tumour. Their cause depends on a complexity of conditions generally speaking they may be said to result either from pressure exerted by the tumour on the nerve tissue in its neighbourhood or on their complete destruction. The intimate way

in which cortical centres & nerves are connected together & the sympathy existing between them often renders it difficult to trust to the suggestions of even the so-called localising symptoms.
In some case the symptoms present are chiefly, if not exclusively, of a localising character (B. M. J. Dec 22. 1900) Byron Brammell reports a case of a sailor aged 24 unmarried first admitted to R. I. E. on Febr 1899 suffering from localised Epileptiform attacks these were for most part Jacksonian in character, the spasms commenced either on left side of face or left hand. Patient was discharged in March & readmitted on Sept 26. 1899. much in statu quo, as no decided improvement occurred under Iodidi of Potasium & Bromide of Potasium. the patient was trephined by Mr Colerell

The condition having been diagnosed by Byron Bramwell as glioma of brain. Nothing was found on operation which was performed on Dec 12. 1899. The patient made a good recovery, but the fits continued. He was discharged from Hospital on Jan. 10. 1900. He again present himself on Oct 9 1900. For a month headache & vomiting were severe, double optic neuritis was not present & the cerebral hernia of some size projected at seat of operation. The patient died suddenly in a fit a few days after admission.

On post mortem examination an extensive glioma was found infiltrating the cortex & subcortical tissue. The case was an illustration of one of those cases of intracranial tumours, in which there are well marked localizing symptoms without any general symptoms. Until a

mouth before death the patient complained of no headache or vomiting. And during the first year there was no optic neuritis. Dr Byron Bramwell also in the same number refers to another case of glioma, which was found on post mortem examination one & half inches from surface, immediately below the seat of operation over the right motor area, arm centre.
This case gave no general symptoms, only localising symptoms
In this connection some reference should be made to a somewhat notable case described by Drs Elder & Miles in a recent number of the Lancet (Feb. 8. 1902). They maintain on the ground of a case of tumour of the left prefrontal lobe which they successfully diagnosed, localised & removed by operation that the time has come when we should discard the idea that

the prefrontal lobes are silent regions "thatis" regions of the brain wherein the presence of tumour give rise to no symptoms. The seat of the tumour in the case referred to by them was indicated by two classes of symptoms

(1) The slight paresis of the right arm & the more distinct paresis of the right side of the lower part of the face with dysarthria in speaking but no aphasia, pointed to a lesion of the left side of the brain. One other symptom gave the same indication—the presence of a swelling over the left frontal region.

(2) In addition to the above symptoms there was present a group of mental symptoms which were significant enough to constitute in themselves a sufficient ground for an operation over the left frontal lobe. These were the result of the loss of the power of inhibition — a loss

of self control & will power. As a consequence the man's character or ego was changed. He could not exercise control over certain organic functions, e.g. those of the bladder & rectum. He lost all sense of shame & modesty & all power of persistent attention, comparison & judgement was gone. This absence of the power of inhibition or control pointed to a tumour in the frontal lobes, which are generally regarded as the physical basis of the processes of voluntary inhibition. Moreover since it is held that the left prefrontal lobe takes a more prominent part in higher cerebration that the right prefrontal, there seemed to be a wonderful concurrence of symptoms pointing to a tumour in the left prefrontal lobe. The operation which followed was successful & fully justified. ~~The~~ reliance

placed on the symptoms specified. This case, it is alleged proves that we have no right to treat the prefrontal lobes as "silent regions"

XII Third group of symptoms

They consist of symptoms which depend upon the rate of growth of the tumour. Tumours which grow slowly are generally innocent, while rapidly growing ones are more likely to be of a malignant character. A large tumour growing rapidly must by its mere bulk lead to compression of capillaries with anaemia & consequent symptoms of pressure, whereas in the case of small slowly growing tumours the pressure may lead to gradual atrophy of brain matter instead of compression of vessels & symptoms may be absent. Pressure of a small tumour may give rise to general sclerosis of one hemisphere causing a consider-

increase in its size. Such cases are however very rare.

xiii. Treatment:-

There are two different kinds of treatment to which intra cranial tumours may be subjected.

(a) Drug treatment. The aim here is either the complete removal or absorption of the tumour by means of drugs, or failing this the relief of some of the attendant symptoms

(b) Operative treatment. In this case too either of two objects is aimed at. When the conditions are favourable, the operation may attempt & effect a complete removal of the growth. In the majority of cases however owing to circumstances already mentioned, this cannot be attempted. Under such circumstances palliative treatment only is adopted. It is found that where drugs are of no avail & where complete surgical remov-

al is out of question, palliative trephining is attended with marked relief of some of the more distressing symptoms.

XIV Drug treatment.

The value of drug treatment is much limited by the fact that it seems to affect beneficially only a few varieties of tumour. Syphilitic tumours & in a much less degree tuberculous tumours are the only species which experience has shown to be with certainty amenable to drugs. A case of tuberculous tumour may become quiescent under the administration of Ol. Morrhuae &c., but according to Horsley such treatment should not be continued beyond four months, unless there are signs of improvement (B. M. J. Dec 23. 1893). In other cases Iodides will probably be given a trial & the limit is

put by Dr. Allan Starr at three months for this treatment, & by Victor Horsley at six weeks, Gowers supports Horsley's opinion in reference to drug treatment vide (Brit. Dec 23 1893).

In the case of syphilis the cure is effected by Pot. Iod. The following cases may be cited as instances of cure effected by means of drugs. Dr. James Taylor in (Brit. Jan. 13. 1900) reports two cases of cerebral syphilis which caused symptoms of tumour to be present. They responded to anti syphilitic treatment.

Dr. Althaus in (Brit Nov 16 1895) refers to a case of cerebral tumour in a lady age 36 which responded to Hyd. Bi. perchlor & Pot. Iod. with complete recovery. He supposed it to be a glioma, but more probably it was specific

In connection with the successful action of drugs in the case

of syphilitic tumours two circumstances pointed out by Byron Brawell should be noted as limiting considerations (1) Drug treatment is seldom effective unless applied at an early stage of the disease = It may be attended by after results which entail the complete insanity of the patient. If therefore a syphilitic tumour can be localised & removed, it is very advisable that an operation should be performed, that is if the patient's general constitution is not affected by the disease & there is no grave syphilitic lesions elsewhere. Gliomata are sometimes temporily benefited by Iodides There are on record several cases but in none did the improvement last for more than a few weeks Scarcoma has also been temporily relieved by arsenic

XV Operative treatment:-
When drug treatment has failed to yield satisfactory results & the patient is distressed by the presence of urgent symptoms it may be found necessary to resort to operative treatment. The form of operation to be undertaken will be determined in part by the presence or absence of localising symptoms & in part by the accessibility of the tumour. Fortunately tumours which are most easily removed are also the ones most easily localised

(a) Radical treatment: that is, an attempt at the complete removal of the tumour by surgical interference. Only a comparatively small number of cases fall under this category. This is borne out by the statement already quoted of Byron Bramwell, that of 45 cases of intracranial tumour which came under his notice

either in hospital or in private practise for a period of five years. In 13 of which the operation of trephining had been most satisfactorily performed, there was not a single instance in which the tumour was successfully removed.

That tumours may be successfully removed from the brain has been shown not infrequently, & that the operation might more often have been successfully performed would appear from post mortem report study. The average from pathological reports give 7 per. cent at Guy's post mortem rooms as proportion of operable tumours Dr. Allan Starr thinks it should be as high as 10. p. c. Dr. Hale White in reports for 1885 published an account of 100 cases of cerebral tumour, which were presented at Guy's Hospital, and among them only 8 p. c.

could be removed. But the proportion of tumours both operable & localisable is of course considerably smaller. Among 53 cases examined post mortem at Guy's during 1885 to 1898. The cases of tumour could probably have been successfully removed, but in only one of these could it have been localised as well. These figures indicate roughly 10 p. c. of cases to be operable, that is, of such a nature that the tumour could be removed, & only 2 p. c both operable & localisable. To get the true proportion of cases both operable & localisable, it is necessary to add to the above cases any successful cases of removal during the same period. In the case we are considering, there was only one such case, consequently about 4 p. c of cases would be both operable & localisable. Again Dr Allan Starr

published in 1897. an account of 50 cases which came under his observation, of these 18 were could be open re commended for operation; 15 were operated on; in 9 the tumour was found & in 8 successfully removed. According to this calculation there are 10 p. c of cases in which the tumour can be localised & removed.

The tumours most frequently got rid of, and most amenable to removal are Sarcomata & Gliomata (encapsuled). Tubercolous tumour may also be successfully removed as in the case mentioned in (B.M.J. Dec 23 1893) in which Horsley operated. In this case it was found that six years later the brain was free from tubercle. Horsley is of opinion that if a tubercular tumour can be localised in an accessible position & there is no evidence of others being present, removal

should certainly be attempted. vide (Brit Med Dec 23 1893)
Macewan reports removal of several tuberculous tumours from the cerebellum, the operation consisting of two stages, and although the patient died suddenly 10 months afterwards from oedema of brain, The fact that he lived so long & with the relief of all his symptoms is an encouragement to operate for tuberculous tumours. Horsley is of opinion that syphilitic tumours are only curable by removal, being accompanied by Pachymeningitis which is necessarily progressive (Brit Med Dec 23 1893) Harrison removed a syphilitic tumour successfully from Motor area. The wound healed by primary union but the patient sank from exhaustion. The one successful case among Guy's reports in which a tumour of Dura Mater Motor area was removed from

a woman aged 40 years, who suffered from Jacksonian Epilepsy, was syphilitic in nature. When tumour removal is out of the question, the wisest & often only possible course to adopt is to seek by means of palliative trephining to relieve the weight of intracranial pressure

XVI Palliative trephining

The results of an operation which is merely palliative in purpose & which stops short of complete cure & removal are often ~~of such~~ productive of such signal benefit & relief to the patient, that one has ground for claiming a somewhat unique position for palliative treatment in the case of intracranial tumours. There are however two principal objections to trephining which must always be taken into consideration. Firstly, there is sometimes after operation a troublesome hernia cerebri, but often

even when intracranial pressure is very great the cerebral protrusion gives rise to no difficulty. Dr Hale White who has conducted many cases of trephining, says that in only one case was the degree of hernia cerebri so great as to cause him to regret the operation.
Secondly. Paralysis has occasionally followed operation, the explanation is that the removal of bone causes the brain owing to great intra cranial pressure to be jammed against the edges of the wound in the bone. Owing to these contingencies it is only right that the patient should be warned that though trephining will relieve his headache & avert blindness, there is a possibility which is somewhat remote of a hernia cerebri or paralysis setting in.

XVII Classifications of operations:-
Palliative operations may be of various kinds, The most important & the ones most frequently performed are the following
I In cases where the tumour is diagnosed, but not localisable or diagnosed in an inaccessible position; the trephining aims merely at relieving tension, the dura mater being left intact
II Cases of trephining where the bone is removed & dura mater incised
III Cases where the tumour is partially removed
IV Cases where the cavity of a cyst or abscess is drained
V Cases where the Ventricles of the brain are drained, when Hydrocephalus due to tumour is present.

XVIII Detailed consideration of the first class of palliative operations. The distinctive feature of this class

is that the bone is trephined, whilst the dura mater is left intact. The objects is to relieve tension & avoid the most distressing of the attendant symptoms. Bastor & Ballance are of opinion that it is a useless proceeding, & quote in support of their view experiments performed by them on dead dogs, in which only 5 4 c.c. of oil was made to enter the dural cavity through the occipito-atlantoid ligament, the oil standing at 1000 m.m in a capillary tube, Experience, however seems to show that in some cases benefit may be derived from this proceeding. In a case reported by Mitchel Clarke & Horton the patient suffered from severe headache, convulsions, deteriorating memory, failing sight due to double optic neuritis, & vomiting irrespective of food. There was no localising symptoms & there-

for a palliative operation was performed; a circle of bone 2½ inches in diameter was removed from parietal region & the dura mater bulging was not incised, & the scalp flap was sewn over it. Headache was immediately relieved, sleep returned, & six months later the only complaint was deterioration in vision. Caton & Paul reported a case, 2½ years after onset of symptoms of acromegaly. There were present acute pain in the left side of face & headache together with frequent vomiting, right optic atrophy, & left optic neuritis. It was decided to perform a palliative operation for the relief of the intense headache & progressive loss of vision. 3½ square inches of bone was removed, dura mater was exposed in right temporal region, the membrane protruded but was

not incised. The wound never completely healed, but the patient lived comfortably, & after the lapse of three months an improvement of vision set in.

The following case illustrates the great benefit often derived from palliative operation of this kind for headache, vomiting & optic neuritis. The patient was admitted into Guy's Hospital under Hale White. The headache began in August 1892 & loss of sight set in, in the following September, at first, both symptoms fluctuated, but by Jan 1893. the headache was very severe & constant She could only differentiate light from darkness, & optic atrophy secondary to optic neuritis was observed to be setting in.

The headache remained very severe & persistent & the almost total blindness continued for 21 months. The discs in the

meantime were slowly becoming atrophied. On August 31. 1894 some bone, but no dura mater was removed, & the pieces of bone were replaced. She improved so rapidly that in three days the headache had quite gone & in three weeks she could distinguish fingers held up at a distance of five feet. Rather more than three months after operation the sight again failed & rather less than four months the headache returned. These cases show that this form of operation has its uses, & may in some cases be fairly tried before the further step of incising dura mater is resorted too.
apart from the relief of urgent symptoms for which the operation is primarily performed Horsley is of opinion that the mere opening of the skull may lead to such alteration in the condition of nutrition of the growth

as to cause quiescence or retrogression in it, the quotes two cases in which at the time of operation were found undoubtedly to be rapidly growing malignant tumour, which after death were found to have undergone destruction.

XIX The of Second class of operation:- The operation here involves trephining; removal of bone & incision of dura mater. It is generally undertaken with a view to permanent cure & removal of tumour, but that it may be also employed as a palliative treatment is seen from the case previously referred to operated on by Dr Hale White at Guy's Hospital in Aug 31. 1894. The symptoms having recurred with such severity the surgeons decided to operate again on Jan 15th 1895. A considerable area of bone & dura mater was re-

moved. The headache at once disappeared, the sight again improved greatly. In two months however the headache returned, & the sight again failed. On April 23. 1895 more bone & dura mater was removed & again the headache disappeared & vision improved, but the improvement in both respects lasted only a fortnight. On May 22. 1895 more bone & dura mater was removed with the result that headache disappeared, & eyesight improved, this time lasting longer & although some headache returned, the improvement in sight was not permanent, for the patient became blind. She was quite certain that until a year before her death in 1900, the headache was much less than before the skull was opened. This case illustrates admirably the benefit which may follow trephining for relief of headache & blindness. It is un-

usual in the fact that the operation was performed four times. The best evidence that it was beneficial, is the fact that after the first operation the patient returned to Hospital of her own accord, with the request that she might be trephined, as she had felt such relief from the first operation. That this palliative operation was justifiable is beyond doubt, for it relieved the agonising headache, restored the patients sight, & in all probability prolonged her life. Dr Hale White in referring to the above case, says that he believes it is usual in intra cranial operations to open the dura-mater, but in the first operation on this patient this was not done & yet there was considerable relief. No doubt, generally speaking it is much better to open the dura-mater, but this case appears to show that if in any patient there is very great intra

cranial pressure, it might be worth while to try the effect of not opening the dura-mater, for that can always be done at a subsequent operation. It also avoids hernia cerebri.

The post mortem examination which was made by Dr. Bryant revealed a tumour, which was found to be a spindle celled Sarcoma of the left Caudate nucleus measuring 20 m. m. in transverse & 25 m. m in longitudinal diameter.

A case which suggests at least a quiescence of the tumour after operation was operated on at Guys in early part of 1898. Patient was a girl of 16. years of age, admitted for blindness & headache. A month before admission she was seized by a fit, in which the left angle of her mouth was drawn down. This was followed by paresis of left arm & leg; sickness, headache and aching

of eyes. Four days before admission the patient stated, that she woke quite blind in the left eye & that since then she became gradually blind in the right eye. On admission she was very apathetic & almost blind, distinguishing only between darkness & light. There was well marked double optic neuritis & no atrophy. After a month of treatment by drugs during which there was no improvement in the symptoms, an area of bone about 2½ square inches was removed from the right parietal region, the dura mater bulged, & was opened, brain then bulged into the wound but appeared to be normal & was not explored. The dura mater was not sutured, the bone was not replaced & the flaps of soft parts were stitched up over the wound. Headache & vomiting were immediately relieved.
A week after the operation the pat-

ient could read & the inflamation of the disc's was seen to be subsiding In a fortnight the wound was quite healed. Patient was discharged feeling quite well. There was some bulging at the site of operation. In 1900 the patient was well in every way, there was no hernia cerebri, the eyesight was good, & there was no sign of increased intra cranial pressure. There is therefore every hope that the tumour has become quiescent.

Of 14 cases in which this operation was performed at Guy's during the last 10 years. Seven cases died within a month. In six cases there was marked improvement, which in three of them lasted for two years. In one case there was only slight improvement. ~~In one c~~ Analysis of the cases which died will show these figures to be more favourable than at first sight appears. In 3 cases

the tumour was tuberculous in nature: of these, one died of general tubercul osis, having been previously com pletely relieved of headache. Another died of tubercular meu- ingitis. In the third case in which there was a caseous tuber cular tumour of the size of a cricket ball, operation had been unduly postponed. Had it been performed earlier, & not in 19 months after the first symptoms, it might have secured relief, if not a cure. In the fourth of the cases that proved fatal, there was profuse haemorrhage from the emiss ory veins at the time of operation & the patient died exhausted on the same evening.

The fifth case was one of secondary carcinoma. A month after the operation which had caused an improvement in the general con- dition the patient died of Pneumonia.

In the sixth case although the patient died comatose a month after operation, headache had been completely relieved & in the first fortnight his mental condition was improved

The seventh case seems the only one in which the operation completely failed. It was performed for the relief of blindness due to tumour of the meninges pressing upon the brain in the temporo-sphenoidal region. Although optic atrophy was not present, the operation not only failed to produce improvement of vision, but the patients mental condition rapidly deteriorated, & death occurred within a month.

The above cases would seem to justify the view that the great benefit often received by the patient far outweighs the possible harm done in a few unsuccessful cases

xx The third classification:-

This consists of operations which involve in addition to trephining a removal of a portion of the tumour.

It is sometimes found that only a partial removal of the growth is possible & that the removal of a part may act beneficially on the remainder. Victor Horsley vide (Clifford Allbutt Vol vij. p. 665). is of opinion that the removal of a portion of a tumour often produces a retarding influence upon the growth & development of the portion of the tumour that remains.

In (B.M.J Dec 23. 1893) we find that Horsley removed part of a tuberculous tumour from the brain, & on post-mortem examination six years later the brain showed no trace of tubercle.

Among the cases at Guy's during the last 10 years there was one case in which a firm

vascular tumour was shelled out from postfrontal & parietal region of the brain, the tumour being attached to the dura-mater externally & medially about abutting upon the Falx cerebri. The patient recovered from the immediate effects of the operation, but died 4 days later, having developed facial erysipelas. The brain had begun to expand & but for the supervention of erysipelas the patient might have lived for some time relieved from his distressing symptoms; which comprised, severe headache, vomiting, impairment of sight, smell, & paresis &c. That the case would probably not have been a cure was evident on post mortem examination by the fact that portions of the growth were found adherent to Falx cerebri.

Mr J. M. Caird showed a case of a woman after partial removal

of an intra-cranial tumour, at the Edinbro Medico-Chirurgical Society (Vide. Lancet. March 15. 1902)

XXI The fourth classification:-
These are operations which consist in draining an abscess or the cavity of a cyst. Macewan reports the case of a blow to the forehead by a stone, suppuration occurred in the wound, followed by headache, drowsiness, vomiting, occasional rigors & double optic neuritis. Apart from these general symptoms there was no affection of motion or sensation. The patient was trephined & an abscess was evacuated in the left frontal lobe. Symptoms were relieved & patient recovered.

In (B. M. J. March 14. 1896) Mr. Charles. A. Ballance relates the case of a boy eleven years of age admitted to the National Hospital, for paralysis & epilepsy under Dr Gowers in Oct 1890

Six months before he had had a severe blow on the head, Since the injury he had suffered success wely from following symptoms. Irritable temper, fits commencing with twitching of right angle of mouth & followed by paralysis of lower side of right face, gradual extension of paralysis to right upper & lower extremities, slow speech, severe frontal headache and purposeless vomiting. After admission to Hospital these symptoms increased in severity, & double optic neuritis was observed. In Nov. 1900 a portion of bone was removed by means of trephining from over region of lower part of left motor cortex. A subcortical cyst was found & vacuated, ~~The~~ the symptoms disappeared. In Feb 1901 as the symptoms recurred a tube was passed into the cyst in order to drain it

Continuously. The symptoms then in most part disappeared & the boy remained in fairly good health.

In Jan. 1893 when the condition became exceedingly grave, another operation was performed and a tumour three ounces in weight was removed from between the dura mater & left motor cortex, the boy left hospital quite well except for very slight hemiplegia.

In September 1893 he was readmitted in an almost moribund condition, & died in a few hours after another attempt was made to relieve the symptoms of pressure by operation On post mortem an enormous tumour was found situated in the left cerebral-hemisphere In (Brit March 21. 1896) Dr Coleman & Mr Ballance report a case of cyst in a lady 32 years of age who had previous

& had & excellent health. Symptoms commenced w an isolated fit, followed in 5 months by vomiting, some agraphia, alexia & aphasia with weakness of right hand & latter by optic neuritis & ~~agnosia~~ agonising headache.

Some relief was temporily obtained from administration of Iodides, & it was decided to relieve pressure by operation in two stages. For right subcortical tumour of Angular Gyrus had been diagnosed. At the first operation 3 in square of bone was removed & dura mater bulged. At this stage the headache & other symptoms were relieved for a week. The dura mater was then incised & a cyst containing coagulable plasma was exposed & drained. The symptoms cleared up, yet two months later drainage being imperfect the symptoms re-

turned & the patient died from pneumonia. There is a very good case of Actinomycotic abscess of brain upon which Berger operated. The patient had two years previously been operated upon for a actinomycotic abscess of the chest, which had practically healed up. An actinomycotic lesion of brain was diagnosed from gradual increased weakness of left arm. To this in time were added paresis of left leg & left side of face, headache, vomiting & coma, and by the time permission to operate was granted the patient was apparently comatose. By trephining & draining the abscess, life was prolonged for eight months with gradual improvement of all the symptoms. On post mortem examination another actinomycotic mass was found beneath right frontal & parietal con-

volutionis. It is therefore possible that had permission been given sooner to operate, complete removal of the tumour might have been effected

A third case recently operated on at Guy's deserves mention. The chief symptom was the occurrence at decreasing intervals of epileptiform convulsions beginning with twitchings of mouth. Six months after the first of these the lower part of Rolandic area of right side was exposed by trephining & a thin walled superficial cyst was found compressing the motor cortex. This was drained & the convulsions ceased. The patient died in four days from purulent meningitis. Although undoubted relief was accorded in the first two cases. The prospect of recovery were still more favourable

in the case of the last, had not
septic unfortunately supervened
In (Blue Oct 28. 1899) There
is recorded a case of a bullet
in the brain producing in 9
months time an abscess. Victor
Horsley operated & there was re
covery. The case was reported by
Dr A. St. Bampton. Ilkley.
In (Blue March 21. 1896).
Beevor & Horsley report a case of
an abscess in Angular Gyrus
developing as the result of a
kick in a boy. Skull was
trephined & dura mater incised
to relieve pressure.
In (Blue March 7. 1894) Mr C
Mansell Moullin reports a case of
a boy aged 14 who receives a blow
on his head & subsequently developed
the symptoms of tumour. On te-
phining an abscess superficial to
periosteum was found & drained
Some days later symptoms of
optic neuritis & increased intra-

cranial pressure developed. The skull was trephined over the temporo-sphenoidal lobe, the dura mater was found to be healthy but bulged. Trocar & Canula were inserted without success. They then trephined over the cerebellum, & again explored without success. They then drained a few drams of fluid from the descending cornu of lateral ventricle. Patient died in 24 hours after the operation, comatose. Post mortem examination showed an old encapsuled abscess in the left temporo-sphenoidal lobe. The abscess had probably been roused to activity by the blow. Had this abscess been successfully explored & drained, the symptoms would probably have been relieved, & the patient's life prolonged, if not cured.

xxii The fifth class of operation:-
This class consists in draining the ventricles in a case of Hydrocephalus due to tumour pressing on the roof of the fourth ventricle or occluding the foramen of Magendie or encircling the iter or obstructing the return of blood by the veins of Galen. These cases are by no means rare. Among 53 cases of cerebral tumour which died at Guys from 1885 to 1895 inclusive, there were 9 such cases of these tumours. Two were tuberculous, two were glioma, two of unspecified nature, one a large cyst having a small tumour projecting from its posterior wall, one a mixed celled sarcoma & one a gummatous tumour. In 5 of these cases the tumour was situated in the cerebellum, in 3 it involved the wall of the iter & in the other the tumour was situated in the interpeduncular space & pushed the floor of third ventricle upwards In only one of these cases was an

operation performed. The occipital region was trephined, but there was no relief & the patient died in eleven days. In such cases the cerebrospinal fluid secreted by the choroid plexuses is unable to make its way from the ventricular system into the subarachnoid space, & then escape by the various channels, the lymphatics, nerve sheaths & pacchionian bodies into the general circulation. In the choroid plexuses the resistance to blood flow is probably less & capillary pressure higher than elsewhere in the brain. It is highly probable that much of the cerebrospinal fluid is secreted from these vascular fringes & passing into the general meningeal spaces is absorbed by veins Should the Sylvian aqueduct or foramen of Magendie be blocked ventricular hydrocephalus may result, owing to the fact that the secretion takes place faster than absorption, & is at a higher pressure

than that of cerebral veins. If the veins of Galen are blocked, the pressure in the choroidal fringes will rise almost to that of the arteries owing to a deficiency of anastomosis with these veins. In such cases secretion is faster than absorption & hydrocephalus results. A local collection of fluid in the ventricles at a higher pressure than cerebral capill arg pressure must lead to cerebral anaemia & atrophy.
The rational treatment for such cases would seem to establish a communication between the ventricular system & the subarachnoid space, to take the place of the normal paths of communication. In (Brit. J. Dec 23. 1893) Prof. Sahli of Berne suggests in 1890, the permanent drainage of the lateral ventricles. The operation has since been performed by Prof. Kocher, in a few cases with favourable results.
In a case of acute Hydrocephalus

Mr. Watson Cheyne inserted a catgut drain leading from lateral ventricle to subdural space & closed the cranial opening. Under this treatment the head rapidly diminished in size & symptoms disappeared. Drainage of ventricles into the tissues of the scalp appears not to be feasible proceeding.
Lucas. In several instances tried this method for meningocele, but the fluid did not drain away & in addition sepsis supervened.
An interesting case was presented at Guys in Jan 1898. The patient who had spent some years abroad, due to her pulmonary condition, suffered from rapid loss of vision. There was also headache, vomiting & rapidly progressing double optic neuritis. These symptoms steadily increased in intensity & to them were added staggering gait, mental deterioration & erratic menstruation. Treatment by Iodides

was commenced, but the symptoms progressed so rapidly especially optic neuritis, which was going on to atrophy; that in three weeks after admission it was decided to operate.

The left occipital region was trephined & a piece of bone 2½ in by 3½ in was removed the dura mater was incised & the brain bulged very greatly, it was explored in several directions with a needle, but without result, the scalp flap was then sewn up. After the operation the patient was much collapsed & right hemiplegia & aphasia were present. After a few days one end of the flap incision opened & clear fluid escaped probably making its way from the ventricle by one of the needle punctures. In this way for a time one or two pints of fluid would escape daily, after which the sinus would heal up, until

the accumulated fluid had to be released; this was done at first at intervals of two days a week, but the necessity gradually became less frequent until finally the patient went for several months without drainage.
When the accumulation of fluid became excessive, the patient became greatly excited & saw flashes of light & goblins, & she heard noises; then the breathing & pulse began to fail & she became cyanosed. Relief was immediately obtained by passing a needle & reestablishing the flow.
The patient is now free from headache & her vision has improved, but the mental condition is childlike. There is a hernia cerebri as big as a cocoa-nut & the fluid has still occasionally to be drained away. The freedom from sepsis in this case is remarkable & may be explained by the fluid tend-

ing to wash away all organisms.

Batty Tuke suggested lumbar laminectomy, & the insertion of a horse hair drain within the pial sac in order to relieve the intracranial pressure which he supposed to be the prime factor in cerebral paralysis.

Such an operation was successfully performed by Duncan for traumatic injury to the spine the patient recovering. But the suggestion of such an operation to relieve intra cranial press. we seems to be based upon a false assumption for according to Hill at any pressure above the cerebral venous pressure the cerebrospinal fluid rapidly leaks away from the cranial cavity.

In all case of trephining for tumour that I should seem I cannot find it mentioned that there was ever any excess of fluid

in the subarachnoid space
But even supposing that such
excess of fluid be present Hill
states that under this condition
the great brain is driven down
& blocks the isthmus tentorii
cerebelli; while at the same
time the cerebellum & bulb
descend & completely block
the foramen magendie so that
there is complete pressure con-
tinuity between the cranial &
vertebral cavities. For these
reasons it would seem that such
an operation directed towards reliev-
ing intracranial pressure by drain-
ing the vertebral canal would
be useless. The severe symptoms &
the almost certain fatal results of
the increased intracranial ventric-
ular pressure of the brain renders any
operation which offers a reasonable
promise of relief deserving of careful consider
ation. A few years ago it was shown that in
many of these cases the excessive pressure could be relieved

by puncture with a probe of the roof of the fourth Ventricle. Three striking examples of the value of this basal drainage have been recorded by Dr D. E. Dransley & in all three cases very great improvement followed. vide (Lancet Nov 23 1901).

Case I. A boy age 14 years was admitted into the Wolverhampton & Stafford General Hospital under the care of Dr J. A. Codd on March 9th 1900. Complaining of severe headache. He had measles two years previously & after had a slight discharge of matter from both ears this left him a little deaf on the right side, About the beginning of February 1900. he was taken ill with pain in the head & back of the neck. He was ill at home for 5 weeks with pain & sickness & was treated for influenza. On March 9th he was seen by Dr Codd who found intense double optic neuritis. Vision however was not noticably impaired; there was no ataxia ocular palsy or any local symptom. There was still a little purulent discharge in the left meatus. He was admitted & treated with large doses of Potassium Iodide. The headache improved & the vomiting

which had never been very frequent or typically "cerebral" ceased. He was sent home & attended as an outpatient. The headache reappeared as badly as ever & on May 31 he was readmitted to the surgical ward. He was a bright intelligent lad with prominent eyes. The optic neuritis was still intense but there were no localizing symptoms of any kind & the pulse was not abnormally slow. Beyond a small perforation in the left Shrapnel's membrane there was no sign of old or recent otitis. He was however slightly deaf in the right ear. In the absence of localizing symptoms a provisional diagnosis of cerebellar tumour was made & it was decided to trephine the posterior fossa in order to examine the cerebellum to relieve the intracranial tension & to prevent the danger of optic atrophy & blindness. The possibility of cerebellar abscess from otitis, although improbable together with the complete absence of localizing symptoms led to the selection of the left side for trephining because the traces of past otitis seemed more evident on that side, a curved flap was turned down & a ¾ in trephine

opening was made, a little to the left of the middle line immediately below the lateral sinus. On incising the dura Mater the cerebellum bulged through & pulsated very faintly no sign of ~~abs~~ abscess or tumour was detected. a curved director was passed beneath the cerebellum in the direction of the fourth ventricle for over an inch but no fluid escaped. Two silk drains were then passed some distance beneath the cerebellum & brought out one at each angle of the scalp wound which was closed without displacing the bone or suturing the dura mater. Headache was at once relieved by the operation. A little serous discharge escaped from the one angle of the wound when dressed on the eighth day. The following day both drains were removed & the wound had healed. On the twelfth day the patient got up but vomited on returning to bed. On that date the neuritis was already observed to be less. 22 days after the operation it had almost cleared up. but the upper inner quadrants were still indistinct. He returned home 4 weeks after operation

Headache soon returned, but now in severe paroxysms not continuously as before. The slight bulging through the trephine opening present when he was discharged increased till it projected nearly an inch above the general surface of the scalp. This swelling was partly reducible & felt like fluid. The paroxysm of headache were relieved by antipyrine & gradually ceased. Four months after the operation the swelling had almost gone & the lad returned to work as an errand boy. On Dec 12. 1900 the boy was again examined there was no sign of past neuritis in either eye & no atrophy. But he thought that sight was not as good as formerly. He was well & free from symptoms. The swelling over the trephine opening was variable at this date it was about 1½ in. in diameter. & ¾ in high. At present (Sept 1901). he continues well & at work

Case II A man aged 30 years was admitted to Hospital on April 16. 01. He had suffered for past 9 months from pains in the head & partial deafness in the left ear. There was a possible history of Syphilis 3 or 4 years

before she had been treated for headache with
Antisyphilitic remedies without any effect. On
admission he was strong & healthy. Head some
what large with prominent overhanging forhead
The pain in head was chiefly frontal, worse on
left side. It was made worse by use of the eyes
& he complained that his eyes (right) was somewhat in-
distinct. There was marked nystagmus of
both eyes on looking to right or left: but no squint,
ocular or pupillary paralysis or inequality of
pupils. There was intense double optic neuritis &
swelling of discs. He complained of numbness
of right side of cheek over an area which was
marked out, including nearly the whole cheek,
no facial paralysis, jaws, tongue or larynx.
He had staggering gate on walking, but could
stand with his eyes closed. Giddiness at times.
He was not intelligent enough to give a clear account
of his sensations, marked incoordination of both
hands, knee jerks exaggerated, urine normal,
& also the thoracic & abdominal viscera. Pulse
was not abnormally slow. Temperature varied
between 97° F. & 98.4 F. It was clear that
there was increased intracranial tension & that the
morbid process involved cranial nerves

Diagnosis. most probable seem to be. tumour of cerebellum involving the middle lobe & encroaching on the pons.

Operation. Trephined 1 inch in Post fossa on right side. Haemorrhage from the veins was profuse & difficult to check. After incising the dura mater the cerebellum bulged into the aperature with out pulsation. There was no sign of tumour visible. The bony opening was enlarged as much as possible in all directions in order to relief tension permanently. A curved blunt elevator was passed inwards beneath the cerebellum towards the fourth ventricle but no fluid was reached. a silk drain was inserted in the same position & the wound was closed without suturing the dura mater. On the same evening the temperature rose to 99° the pulse to 96. t+resper ahours 24. The following day he vomited persistently. The speech simulated bulbar paralysis. The silk drain was removed on second day, but on the day after there was a profuse discharge of cerebro spinal fluid from the wound which continued for 4 weeks. At first sufficient to soak through the dressing & saturate

pillow case, afterward's diminishing & finally ceasing. The wound was healed & the scalp sutures were removed at the end of a week; but the cerebro-spinal fluid continued to drain from a small sinus left after the silk. This finally closed on May 31. On 10th day the temperature rose from the previous level of 97° to 99°. to 103°. & then gradually subsiding to normal. This corresponded to a temporily partial cessation of flow of cerebrospinal fluid & the fall of temperature was accompanied by a resumed profuse flow. The patient was at once relieved of headache & numbness of face by operation, but in other respects his condition was distinctly worse. His speech was slow & indistinct. & he was for a long time so weak in the trunk & limbs that he was unable to sit-up in bed or to feed himself without assistance. This condition slowly improved. 7 weeks after operation. he was able to stand with a little help. & he was allowed to go home. Optic neuritis had entirely subsided. At the time of writing (4 months) after operation. He is in good general health & free from pain. His speech is slow jerky & indistinct, but less so than

it was. Light rather dim, nystagmus has disappeared he is able to stand while holding a table & thinks he is getting stronger. He walks when supported with an extremely spastic gait lifting the feet very high at each step. The knee jerks are still most exaggerated. There is no sign of bulging over fontinne opening only usual pulsation

Case iii A lad aged 18 years was admitted into Hospital June 26. 1907. For some 5 months his parents had noticed that his gait was peculiar & that he sometimes complained of headache & giddiness. He was constant at work & had had no serious illness. On June 14 at 5. 45 pm he was suddenly seized with acute pain in the head, he left his work went home & vomited. On next day the pain continued & he vomited again. He was then seen by a medical man who found him in bed with a temperature of 102. 4° F. marked retraction of the head stiffness of neck & a pulse which was slow in proportion to the temperature. There was much Photophobia & the bowels were constipated. ~~constipated~~. Other signs were negative. He remained for

10 days much in this condition. The pain been unrelieved by purgation, Ice caps, & leeches On admission he was curled up in bed, lying indifferently on either side. He was quite conscious & intelligent as he had been throughout. The pain was continuous with paroxysmal exacerbation's. It began in the occipital region & worked round to the left mastoid region. There was no sign of otitis, present or past on either side. The temperature was 101 F. & pulse 60. The head was retracted & very stiff. He was held in sitting posture with difficulty in order to examine the eyes. Marked double optic neuritis was found, but no tubercles were seen in the choroid. There was no paresis, inequality of pupils or ocular paralysis; but marked photophobia was present. The cranial nerves were unaffected. There had been no local spasms or general convulsions. both knee jerks were exaggerated but there was no loss of power in either limb, the thoracic & abdominal viscera appeared to be normal. The urine contained no albumen the red blood corpuscles & haemoglobin

were normal the Leucocythes number 18.400
On the day after admission the left occipital
bone was exposed below the lateral sinus as
close to the middle line as possible & an open-
ing into the posterior fossa made with a
gouge & afterwards enlarged with a forceps
to the diameter of half an inch. The dura
mater was incised & a curved elevator
was passed beneath the cerebellum into
the fourth ventricle. There was a gush of
about one ounce of clear fluid & the
cerebellum which was previous protrud-
ed somewhat less immediately went within
the skull & pulsated normally. The pulse
momentarily slowed down but soon
rose again to 72. Respiration was un-
affected, a drain of silk worm gut
phenol was passed into the arachnoid
space for about one inch & brought out at
the angle of the wound which was other-
wise completely closed. Two & half hours
later. the boy was free from headache
but the head was still retracted. conval-
escence was rapid. but the temperature
varied daily between 98 & 104° F

for four days & did not reach the normal level until the 9th day. It then continued normal. The pulse frequency remained subnormal for over a fortnight, but the other symptoms gradually subsided. The wound healed by primary union & the drain was removed at the end of a week as no fluid appeared to have drained by it after the first 24 hours. The optic neuritis subsided slowly. A month after the operation the discs were still swollen & indistinct, a fortnight later they had somewhat improved. He had got up at the end of 3 weeks & returned home a few days later. When last seen a month later he was apparently in good health & free from all signs of his illness except the scar on his head; & the still present but subsiding optic neuritis. The cerebrospinal fluid removed at the operation was examined by the clinical research association for the diplococcus intracellularis with negative result.

XXIII Conclusion:-

In the foregoing sections an attempt has been made to give a brief conspectus of the more important facts relating to intracranial tumours. Though the subject has of recent years made remarkable advance, there is yet connected with it much obscurity & many disputable points. Progress must necessarily be slow. For although much valuable information & suggestions have been derived from experiments conducted on the lower animals such as dogs, monkeys etc. Our chief source of information is observation post mortem of tumours produced by accident or disease in the human brain.

In dealing with a case of intracranial tumour it is obvious from what has been said that a surgeon has to face two different sets of difficulties - Theoretical difficulties & Practical difficulties.

The first set consists of those which

~~error~~ arise from inadequate knowledge of the symptoms whereby the disease may be diagnosed & localised, owing either to absence of symptoms or perhaps to the fact that the symptoms have never been discovered, tumours often defy localisation & consequently removal. It must be borne in mind also that the localisation of functions in different parts of the brain area – upon which the localisation of tumour is partly based is itself in the present condition of knowledge largely controversal! Perhaps it may be said that the one thing perfectly well established is that the central convolutions on either side of the fissure of Rolando form a kind of Motor Zone – A region by which all the motor impulses which leave the cortex pass out. There is too, a consensus of opinion in favour of regarding the occipital lobes as an indispensible part for vision in man. Hemiopia, disturbance in

both eyes comes from lesion of either one of them, & total blindness from destruction of both. As to hearing, the temporal lobe is undoubtedly the seat of the hearing function as is borne out by the phenomena. These & kindred positions may be regarded as established.

It is however a mistake to think that the cortex can be mapped out into absolute areas, within which only one movement or sensation is represented. The views of two eminent writers may be quoted on this point. Dr. Wm James writes. "The truth seems to be rather that although there is a correspondence of certain regions of the brain to certain regions of the body, yet the several parts within each bodily region are represented throughout the whole of the corresponding brain region. This however does not prevent each part from having its focus at one spot within the brain region. The various brain regions merge into each other in the

same mixed way". In a similar strain Mr Horsley writes "There are border centres & the area of representation of the face merges into that for the representation of the upper limb. If there was a focal lesion at that point you would have the movements of these two parts starting to-gether" The above statements which tend to show that localising symptoms have to be treated with caution & care are in full agreement with the following statement of Dr Byron Brown-well in Clifford Allbutts Medicine page 648. "It is important to remember that the different cortical centres run one into another, & that they are intimately connected by association fibres & commissural tracts with other parts of the brain tissue; more particularly with the other centres or portions of grey matter with which they are in intimate functional relationship. Consequently distruction or irritation of one centre may produce functional disturbances or derangements, as the

result either of inhibition or of irritation in other, and it may be distant centres."

The second class of difficulties which the operator has to face may be called practical difficulties. Assuming the most favourable conditions in respect of localisation, that is, that in addition to the general symptoms, well marked localising symptoms indicating more or less clearly the exact position of the tumour are present, there still remain one or two questions which are all important — Is the position of the tumour accessible? if so is the tumour itself of such a character as to allow of complete excision? Difficulties which arise from the inaccessibility of the tumour or from its unmanageable nature may be called practical difficulties, as distinguished from those already considered which were due to want of such definite knowledge as would unerringly lead to its localisation.

The above considerations would seem to point to drug treat-

ment & palliative trephining as the proper method's to adopt in the great majority of cases of intracranial tumour

It is a curious fact that those very cases in which surgical interference with a view to complete removal may be most safely attempted are also the cases most amenable to drug treatment. Tumours are most easily localised & most safely reached when they are situated in the motor area of the brain. But the majority of such tumours are syphilitic & respond to treatment by Pot. Iod.

Where the tumour is situated in other parts of the brain there may be no localising symptoms present the tumour having its seat in one of the so called "Silent regions of the Brain" or the symptoms that are present may be misleading, or the tumour itself may possess such pathological character vide section VIII page 16 of this thesis. as to make successful

operative interference impossible.
As the majority of tumours seem to fall under some one of these descriptions, it is extremely rare that one can hope to remove them surgically.

On the other hand experience has shown that palliative trephining though not always unattended with danger, has resulted in innumerable cases of which some examples have been described; in the prolongation of the life of the patient & in a substantial addition to his comfort. In this connection the opinion of D^r Byron Bramwell based on a wide range of experience may be quoted, vide Clifford Allbutt Medicine page 665- "But notwithstanding these risks I am of opinion from the observation of a considerable number of cases in which the operation has actually been performed, that on the whole the advantages to be gained by the operation as a palliative measure

are greater than the disadvantages, & that in those cases, at all events, in which the sufferings of the patient are intense, and in which all other means have failed to give relief, the operation should be performed"

The progress of our knowledge of the localisation of function in the brain may lead to the correlation of definite symptoms with tumours situated in definite parts of the brain & so may help to locate tumours. It is more difficult to see how increased knowledge can help to reduce the difficulties due to the inaccessibility or pathological character of the tumour

In the present position of our knowledge it would seem from the study of the main facts relating to tumour, that the normal method of treatment should be as follows, Firstly:- An attempt should be made to cure or alleviate by means of drug treatment, concomitantly

with this the various palliative means known to medicine should be used.

Secondly:- If the above treatment fails to give relief, palliative trephining should be resorted to, this is known to have put an end to the intense & agonising headache — headache so intense & agonising that if its continuance would involve the patient's death. It also removes optic neuritis & may prevent post neurotic optic atrophy & permanent blindness.

Thirdly: If the condition of the tumour both local & intrinsic are favourable to a complete removal, which is seldom the case, the tumour should be removed by a subsequent of surgical operation. It should however be noted that in almost all cases in which the symptoms are not relieved by large doses of Iodide of ~~Pass~~ Potassium & Hydrag. perchlor the disease

proves fatal & often rapidly fatal.

(signed) R. H. James. M. B & C. M