the progress of surgery. But those of us who inhabit the smaller towns of New England, has not the criticism some application to us? Are we not leaving too much of the work to the Boston men? It is true that we have not the advantage of living in a great medical center, but that advantage is not a necessity to the performance of good work. We country men may not be able to equal the achievements of our Boston colleagues, but if each of us will contribute his mite to the cause of surgical progress and see to it that his mite represents his very best effort, I venture to say that the effect on the Society as a whole and on its individual members will be startlingly beneficial.

In this new beginning of the Society's life, we all hope and expect that it will occupy a position of influence in the medical profession. It is already a body of which we are proud to be members: let us try to make it a Society whose honorary membership will be a prize to be coveted by surgeons from other states and countries. Let us not be content with keeping up with the procession; let us do our utmost to lead it.

Original Articles.

DIAGNOSIS OF THE LESIONS OF THE NERVOUS SYSTEM PRODUCED BY VIOLENT EXPLOSIONS IN CLOSE PROXIMITY WITHOUT EXTERNAL LESIONS.

BY TOM A. WILLIAMS, M.B., C.M., EDIN., WASHINGTON, D. C.,

Lecturer on Nervous and Mental Diseases, Howard University; Neurologist to Freedmen's Hospital; Corresponding Member, Neurological Society of Paris, and of the Academy of Medicine of Rio Janeiro, etc.

THE name commotion has been used without sufficient precision, being applied equally to the result of physical disturbances of the nervous system and to the syndrome which occurs on account of the psychic impression caused by the explosion. The individual tendency of people to be mastered by the words they use has led to much confusion in consequence. Certain observers make a diagnosis of hysteria in all cases where explosion has not produced visible wounds or where neurological examination has not organic lesion. The tendency to such diagnosis is due to the fact that a large proportion of the cases recover in a few weeks or even days after violent concussion. However, that this

generalization is quite unjustified is proven not only by the considerable number of instances where patients whose symptoms have been thought purely hysterical have developed shortly afterwards definite physical signs which at first were absent, but also by the results of experiments with animals subjected to violent explosions.

In a series of experiments producing concussion on rabbits results were as follows: Animals in a large meshed cage showed only slight and evanescent stupefaction. Rabbits which were in a ditch and subjected to explosion evidenced dyspnea from the gas remaining in the trench. When the animals were suspended above the level of the residual gas some of them showed no symptoms, others were depressed and inert, while others showed marked excitement, one of them fleeing in screams whenever approached. But in nearly all there was an increased respiratory rate for half an hour. There was no correspondence between the first symptoms and the progress of the case; for instance, an animal which would lie inert with contracted pupil would appear quite well the next day, while another which seemed much less affected died the following day. Two animals which seemed to recover completely within a day died eight and thirteen days later.

COMMOTION IS THE REAL CAUSE OF MANY OF THE SYMPTOMS WHERE THE SKULL HAS BEEN INJURED

Great stress has been laid upon the "subjectiveness" of some of the functional disturbances which prevail in patients who have been commotioned by a violent explosion. Those symptoms which have been considered "subjective" are accordingly treated with the lightness which is unfortunately usually attached to that word in clinical medicine. This tendency has been the more strong because of the fact that so many of the men who have been commotioned have been able to go straight back into the line after the occurrence, even when in the exceedingly dazed state. Apparently not many of these men relapsed, and hence it was supposed that the complaint of the patients who have been evacuated to the interior were largely products of cultivation, suggestion, or simulation. The uniformity of the complaints did not seem to refute this reasoning, for do we not remember the uniformity which we were taught to expect with regard to the

phenomena of hysteria, which we now know to have been in the main phenomena of culture. The "general" nature of the chief features, namely, headache, cerebral over-fatigability, insomnia, nightmares, changeableness of humor, dizziness, absences, a sensation of cloudiness, were supposed to be the standard complaint of the so-called "neurasthenic," whose disease no pathologist attempted to locate in any particular area of the cerebrum.

The fact that this series of syndromes also showed itself conspicuously in patients who had been trephined did not obviate this interpretation, for observers are unanimous in declaring that the functional disturbances after injuries to the skull are dependent neither upon the seat of the lesion nor upon the apparent gravity of the trauma; for it is observed that functional disturbances showed themselves just as conspicuously in patients in whom only the outer table of the skull had been injured as in patients with deep penetrating and crushing wounds of the brain itself. Indeed, if anything, the latter patients were less prone to serious and long-continued inconveniences than the former. The accompanying table is based upon a study of 470 cases of wounds of the skull. Of these cases only 83, however, were utilized for only of these was it possible to have detailed information about the site, extent, and depth of the wound, and about the details of the surgical operation and of the immediate and secondary complications.

TABLE I.

	LESIONS OF THE EXTER- NAL TABLE		LESIONS OF THE INTER- NAL TABLE		OPEN DURA MATER		LESIONS OF THE CER- EBRAL SUB- STANCE	
	18 cases		28 cases		7 cases		30 cases	
	No. of Cases	Percentages	No. of Cases	Percentages	No. of Cases	Percentages	No. of Cases	Percentages
Headache	16	88.8	25	89.2	6	85.7	20	66.6
Vertigo	9	50	16	57.1	3	42.8	13	43.3
Blurred vision	5	27.7	8	28.5	2	29.5	5	16.6
Fatigability ..	2	11.1	6	21.4	2	29.5	15	50

These general symptoms after skull wounds have been called atopic, *i.e.*, non-localized, by Grasset, because a careful analysis in his clinic of each series of cases studied not only by himself but by Villaret, Mairet, Pieron, Mignard and others, showed that even the clouded vision and the dizziness were unrelated to wounds in any particular locality, and that even the headache by no means predominated

at the site of the cranial breach, although of course there often occurred in this area neuralgic phenomena which, however, were quite distinct from the general headache.

Now, these atopic symptoms which usually eventually cease almost completely in every case, are the same symptoms as those which are manifested by commotioned patients who have had no wound at all. Furthermore, in the latter patients, where opportunity for investigation has existed, there have been found very decided abnormalities of the cerebro-spinal fluid, almost invariably hypertension, usually hyper-albuminosis, and sometimes lymphocytosis as the cases increase in gravity. Again, a considerable number of commotioned patients have shown for a short period, in addition to these symptoms, definite, even when slight, physical signs of focal lesions of the brain.

Thus the resemblance of the two syndromes is so striking that their identity is manifest, and the problem of the nature of the persistent functional disturbances in both can be studied together as a whole. Of course, it is very easy for anyone to declare that he has headaches, is easily fatigued, has attacks of dizziness and blurred vision, especially when exertion is demanded; that he cannot sleep, and has nightmare; and it is not difficult to change one's humor. So that to a superficial observer it might be justifiable to characterize these individuals as perseverators, if not simulators. But, the syndrome is accompanied by other phenomena which are not of a simulable character. For instance, a walk of half a mile will not produce in a simulator hollow eyes, a shrunk and pallid face, profuse sweating and diminution of blood pressure from all of which he will recover only after several hours, nor can one very readily simulate the vascular congestion immediately provoked in such patients when they stoop down, nor will simulation maintain the vascular turgidity of the face and the modifications of the pulse which so many of these patients show. Nor can the modifications of the oculo-cardiac reflex usually seen in these patients be simulated. Nor can the modifications of heat regulation which they show. Furthermore, a simulator who suffers from short absences will be almost certain to declare that they are prolonged. Moreover, he will stagger when he has attacks of vertigo and prolong and exaggerate this phenomenon. Again he will seek to provide occasions

to manifest his malady instead of seeking to avoid them as does the true *commotionné*. Again, a simulator will not confess that his headache is ever ameliorated, whereas the true *commotionné* is only too glad to be free of it if it is only for a few hours, and will readily confess that it tends to improve at night.

LABYRINTHINE REACTIONS.

Modifications of the labyrinthine reactions were present in 87% of 46 soldiers, of whom 28 had head wounds and 18 were merely commotioned.

In only 22 of these was the hearing diminished. A large proportion not exactly stated, however, had tinnitus. In only seven was the Romberg sign present, and none of the patients presented other neurological signs.

The most fruitful test was the galvanic one which is much simpler than either irrigation or rotation, and which does not produce to the same degree the obnubilation which is sometimes very disturbing to the patients. This usually appears after the vertigo and before the turning of the head. The patient cannot reply to questions. He feels stupefied—his ideas become confused. It may persist for minutes after the stimulus has ceased, and even produce loss of consciousness. It may occur when there has been no vertigo, nor deviation of the head. It is most significant when it occurs after stimulation of one labyrinth and does not do so when the diseased side is stimulated.

The most objective part of the test is the inclination of the head, which was modified in 40 of the cases, either by a failure of reaction on one side or by the need of a much stronger current to provoke it, or by change of direction from the normal, which is towards the positive pole, sometimes accompanied by a turning of the chin towards the negative pole. The most common modification is that the head turns away from the injured side whichever way the current is able to pass, along with a rising of the threshold of excitation.

This increase of threshold occurs only in 34.7% of the cases, the limit of the normal being regarded as 5 milliamperes. In seven of the sixteen cases the threshold for both ears was raised, while in nine cases one labyrinth was excitable with the normal amount of three milliamperes. Of the six *commotionnés* who showed a raise of threshold, three presented it on both sides.

When the wound was lateral the increase of resistance to the current was on the same side in six cases, and on the opposite side in three cases, where, however, the wound was large, both parietal and temporal regions being damaged. In all cases, when the threshold was raised for both sides, that traumatised was always the greater. In three cases showing fissure of the occiput in the middle line there was a lowering of the threshold on both sides.

Vertigo is provoked with an only slightly greater current than is inclination of the head, but the two reactions are proportional in health. In disease, however, there may be a great disproportion, the head not inclining until the current has been increased by over 10 milliamperes, whereas it should normally deviate with an increase of not over five. Sometimes the inclination is slow, sometimes abrupt. It may be preceded by oscillations—sometimes even towards the opposite side, or antero-posteriorly. In rare cases the reaction is reversed, but the usual modification after commotion is for the inclination to occur always toward the same side whatever the direction of the galvanic current. In occipital wounds, however, the inclination is sometimes before or backwards.

Other reactional movements of the patient, such as that exemplified by the changing of the plane of the extended arm, are also modified during galvanic stimulation of the labyrinth. In cases where the reactional movement does not occur in the course of a galvanic stimulation which produces vertigo and nystagmus, we can infer a lesion central to the bulbo-pontine region and we should find other clinical signs of disorder of the cerebellar apparatus. The angular deviation of the walk, is another valuable method of searching for disturbances of the equilibratory function.

Any of these tests can be made by means of irrigating the ear also. In many cases irrigated, there was a great discordance between the responses to galvanism, which affords a test more delicate than either the tests by rotation or douching, although, of course, it has not the analytic value of these.

MODIFICATIONS OF THE CEREBRO-SPINAL FLUID.

These occur in a considerable percentage of cases of commotion. They do not usually appear till the end of the second day. They con-

sist of a considerable increase from the normal 30 mm. of water up to 60 or even over 100 of the intrathecal pressure as revealed by a manometer such as that of Claude which reveals an increase of pressure which may continue for several weeks or even months.

It is a little simple aneroid manometer carefully graduated in centimeters of water which is connected by means of a rubber tube to a three-branch cock. The latter, according to its position, brings the needle into communication with the outside or with the manometer.

In the *first position*, a very fine wire is introduced which allows us to clear the needle or to inject a solution of stovaine or novocaine for the anesthesia: lastly and most important the cerebro-spinal fluid can be collected should any escape.

In the *second position*, the pressure of the cerebro-spinal fluid is measured.

With this apparatus, the tension may be evaluated from the beginning without any loss of fluid.

When one is used to performing lumbar puncture, it is sufficient, before crossing the "ligamentum subflava," to turn the cock to the position 2, which connects the needle with the manometer. As soon as the needle has penetrated into the arachnoid, the pressure is shown by the manometer.

If the operation offers any difficulty, the cock must be turned into position 1, and the mandrel should be introduced.

There is nearly always increase of albumen, reaching from 0.50 to 1 gr., or even more after precipitation by acetic or nitric acid.

It should be measured with an albuminometer consisting of a tube of 5 mm. in diameter and graduated in distances found empirically to correspond with one centigram per litre of cerebro-spinal fluid according to the model of Sicard.

In the absence of a graduated tube an approximation can be made by observation of the precipitate when the clinician is experienced.

This is out of proportion to the cytological reaction, which may be slight or even absent. Indeed, a low cell count, along with the other symptoms plead strongly for a commotional reaction as against an inflammatory or syphilitic one.

The proportion of glucose is not disturbed in these cases except for a slight increase. There is no diminution of chlorine.

Of course in the early period there may be hemorrhagic complications which change completely the above picture and show themselves as bloody discolorations, often very faint, and the presence of the erythrocytes and leucocytes, and later on by the presence merely of chrysalids of hematin.

THE CEPHALO-RACHIDIAN FORMULA IN CEREBRAL COMMOTIONS.

From the observation of about 50 *commotionés* studied in a center of the army it is shown that:

1. The percentage of abnormal rachidian fluid was 50%.

2. The habitual existence of a typic commotional formula characterized by hyperalbuminosis (0 gr., .85 to 1 gr. per litre) above all other important cytochemical modifications.

There is noted the absence of meningeal participation (normal chloride and permeability: no leucocytosis), the absence of infection, no fibrine, no hypoglycosia: a marked tendency to hypersecretion (hypertension, frequent hyperglycosia, habitual hypoleucocytosis 0.3 to 0.7 elements for a square mm., perhaps because of the dilution of the fluid). The contrast between the hyperalbuminosis and the normal or diminished leucocyte rate constitutes the albumino-cytologic dissociation or the most often, the albumino-cytologic inversion.

The commotional formula is finally characterized by its evolution: ordinary appearances of the albuminosis after two or three days, habitual disappearance in the course of some weeks or months, the indefinite persistence or very slow regression of the syndrome. This cephalo-rachidian reaction of pure commotion without external wounds is met with in all its characters in many commotions associated with wounds of the scalp where the importance of the nervous lesions may be misappreciated because of the slightness of local lesions. This rachidian formula by its cytologic percentage and its post-traumatic evolution allows us to assert at the same time the reality and the organicity of the commotion.

Psychogenetic Consequences. The preceding considerations show that it is comparatively simple to diagnosticate (and the instances of these are not few) where there are disturbances of physical origin.

It must not be forgotten, however, that lum-

bar puncture has a powerful suggestive influence therapeutically. It is in this way that one can explain a case reported by Pastine where an officer showed a slight lesion of the pyramidal tract, some cerebral dysargia, and intracranial hypertension besides subjective symptoms of pain in the back, deafness, and diminution of sight, as well as slowing of the intellectual faculties, indifference, and amnesia. After a lumbar puncture, which did not improve him considerably the pain of a second attempted puncture which failed caused a sudden and almost complete cure. We have a right to suppose that the painful puncture simply coincided with the period when the physical symptoms had retroceded leaving, however, the patient in the belief, and with the feeling that he could not think or feel or remember, the impression and the inertia of the severe commotion still dominating his mind. The mechanism is quite similar to that described in 1909 in the traumatic neurosis, from a discussion of which I quote the following:

"The initiator of symptoms may, of course, be an actual accident of disease; and equally so it may be derived from the mere idea of injury or disease, so that the clinical problem to be analyzed may be exceedingly complex. . . . The commonest of the fears which result from accident or injury is that of bodily harm. It is difficult for a person of this type, when ignorant of his own structure and functions, to shake off the foreboding created by an impressive catastrophe: and it must not be forgotten that what others regard as trifling, the victim may look upon as catastrophic; judged by its possible effect on him. Prepossession by the idea of one's own disability is an inevitable consequence. This leads to abstraction from and inattention to the affairs of ordinary life which, if not trifling by comparison in the patient's mind, at least cannot claim the attention properly needed. Hence ensues the well-known diminution of the capacity to think clearly and to attend to current affairs.

Other Psychological Disturbances. At the commencement, inertia is decided with marked impairment of altruistic and even of family sentiments, and complete loss of the finer feelings; even the more elementary feelings may suffer, as both appetites and taste may cease for a time.

Later on irritability replaces inertia: it is accompanied often by an exaggerated egotism,

with hostility to any interference with immediate desires. Sometimes, however, fear dominates rather than rage: either of these may occur in fits. In the mildest cases these attacks occur only in nightmare.

The tendency to active dreaming of the patients—even while partially awake—encourages a formation of hallucinations and mild delusions in which the patient may, or may not, relieve for the time.

Amnesia. In testing the intelligence of the patient during recovery it is very important to obtain his coöperation, so that the patient may think it is to his interest to make the most of his abilities: accordingly it should be indicated in his presence that his responses are important in our eyes. But the doctor must take precautions against medical suggestion.

Psychiatrists have been too long content with psychoreactional descriptions which do not help us very practically. Now, in some of these cases reports have been made of icterus, and in other of glycosuria, polyuria or retention of chlorine; while in the others modifications of the blood pressure have been ascertained, and in many a very marked vasomotor instability with dermatographia of various types. In some there are modifications of blood coagulability. Disturbances of gastric and intestinal motility have been observed; and some cases show an alternation of excitation and inhibition of different functions of the autonomic and sympathetic nervous systems including pupillary phenomena. It is needless to go into a minute description of the autonomic and sympathetic syndromes which show themselves more or less purely in these cases, but their number presents an unexampled opportunity for a detailed investigation into the clinical pathology of these conditions.

This syndrome may occur quite apart from any actual shock or explosion. It may express itself as the summation of a long period of dread or of a series of alarms. Indeed, in some cases there has been no active conscious dread but there gradually supervenes a state of inquietude; the patient's nerves are on edge, as he expresses it. (See *Emotions in Warfare*, *N. Y. Med. Jour.*, 1919, Sept. 12.)

Complications. These symptoms seem so clear as to raise no difficulty in the diagnosis of such cases. But they are pure only in the severer cases. In most of the milder cases, they are complicated by either or both of the afore-

mentioned conditions of entirely different mechanism, *viz.*, hysteria and hyperemotivity. These complications are frequent. The patient is often easily disturbed by noises which may make him anxious, somewhat confused; he is often preoccupied by his state of health, and loses his courage and belief in eventual recovery. Sometimes a state of chronic or highly irritable anxiety complicates, but the mechanism of this is different from that of commotion itself, as has been explained.

These patients are particularly liable to pithiatric (symptoms created by suggestion) accidents, more especially when the real commotion has not been severe. It is the coincidence of the rapid cure by suggestion of these mild cases with the fact that many patients without actual commotion present a picture resembling it but due entirely to psychogenetic causes, that is responsible for such opinions, that commotion owes its effects to impressions upon a vivid imagination prepared either by heredity or by exhaustion.

DIAGNOSIS.

The most manifest and rapidly ascertained signs of commotion are the general muscular relaxation, including that of the face, the muscles of the hands and the hypo-tension of the pulse, the dilated pupils and the diminished reflexes, both tendinous and cutaneous. The only one of these symptoms which can be simulated is the general muscular relaxation, but this is not the kind of reaction which simulators are apt to attempt to imitate.

The above condition may be quite temporary. In order that the prognosis be made quickly it is advisable to examine the cerebro-spinal fluid. If after twenty-four hours, no excess of albumen is found, the diagnosis of commotion can be excluded. The presence of albumen, on the contrary, should forbid the sending of the patient back to duty, although he appears functionally to have recovered. Its presence is believed to be due to damage of the choroid plexus, which permits the transudation without diapedesis of leucocytes. Indeed, the lesions may be severe enough to permit of the transudation of erythrocytes, in which case there will be a yellow tint of the spinal fluid.

There is one fallacy only in relation to this diagnosis, namely, that in conditions of chronic compression such as results from tumor or hematoma, there is usually an albuminosis of

the spinal fluid. A man, however, in whom this condition occurs is also sufficiently gravely diseased to be kept away from the front.

The state of hyperalbuminosis without cytological increase contrasts with the increase of cells, even without relative increase in albumen, which occurs in sudden meningeal affections, or even as a result of intoxication of the meninges as in acute acidosis. The cells in this case are usually leucocytes; but in meningismal mumps it is lymphocytes which preponderate as is the case in luetic meningitis also. The condition is accounted for by the fact that diapedesis begins in the early stages of intoxication or inflammation of the choroid plexus before the membrane is sufficiently damaged to permit of transudation of serum. The phenomenon is, therefore, as a rule, quite evanescent, for albumen also becomes excessive in the fluid after one or two days.

The condition after commotion on the contrary, not being due to an intoxicative or inflammatory reaction of the secretory apparatus of the choroid plexus, is not accompanied by diapedesis, but is produced by a mechanical lesion of the membrane, which leads to an exudation of serum without cells, which enters the cerebro-spinal fluid, doing so by passive convection.

Hyperemotivity is particularly frequent in the milder cases of emotion. In some cases this may be purely psychogenetic reaction, the man's accident imbuing him with a terror of the future. But in some cases it is due to cerebral *sideration*. In this case it is nearly always accompanied by clearly perceptible vasomotor modifications in the head. The congestion aggravated by posture or excitement is seen conspicuously in the superficial palpebral and sclerotic veins. It is often conspicuous, too, in the temporal artery and the large veins of the neck. There is, often, a widening of the eyelids and a prominence of the eyeballs which remind one of the aspect in Graves' disease, especially when the patient shows a tachycardia, which is often the case. But other ocular signs of hyperthyroidism, fine tremor, hyperhidrosis, emaciation, the gastrointestinal symptoms do not appear.

The symptoms which do occur may be attributed to damage of the sympathetic nerves in the head. They are even very persistent, lasting for years, and they occur in cases where

hyperemotivity is not a conspicuous feature at all.

This persistence contrasts with the usually rapid disappearance of the hyperemotive syndrome in the patients in whom it has occurred merely as a result of excessive fatigue or of disease. In these men recovery usually occurs in the course of a few weeks, after which they are able to return to their corps. In these cases, the physician usually discerns the signs of malnutrition and exhaustion.

Finally, one has to consider the cases in whom a hyperemotivity has been fostered by the patient's own mental attitude. While these cases have been quite uncommon in the French service, they were very numerous in the British. The occurrence of such cases is dependent

upon the general attitude of the medical corps towards the phenomena of pithiatism, and their power to distinguish accurately between (1) the cases due to lesions, (2) the cases where a real hyperemotivity exists, (3) the cases where pithiatism is the predominant or sole feature.

The cure of such cases is very easily effected when proper methods are utilized. Still better, however, is the prevention of their occurrence, but this can be done only by a medical profession which has a clear grasp of the essentials and principles required for the treatment and its effective application.

The *differential diagnosis* of the syndrome of hyperemotivity and anxiety from that of cerebral commotion and that of pithiatism may be resumed in the following table:

TABLE II.

	COMMOTION (CONCUSSION)	HYPEREMOTIVITY	PITHIATISM
Onset	Immediate. Subjectively, headache.	Sometimes delayed.	Variable. Pseudoexaggeration.
Affectivity	Inertia or indifference with extreme ductility; later, restlessness.	Exaggerated. Resistance to suggestion or persuasion.	Extreme susceptibility to suggestion or persuasion.
Memory	Retrograde amnesia more or less complete.	No amnesia; but poor fixation.	Unaffected.
Sensibility	Dulled.	Exaggerated.	Unaffected.
Intellection	Much retarded and confused.	Untrustworthy.	Unaffected.
Physical signs	Unconsciousness; focal rare; cerebrospinal fluid; hypertension, hyperalbuminosis; slow or rapid pulse; slow or rapid breathing; pupillary changes; vomiting; incontinence; modification of reflexes; labyrinthine troubles.	Purely functional, such as: Tachycardia, vasomotor disturbances, endocrine disturbances, hyperthyroidism, hypermetabolism (or hypo), hyperadrenia, or hypoadrenia, pupillary dilatation, sweating.	None.
Recovery	Slow.	Slow usually.	Rapid under proper treatment.
Treatment	Rest, lumbar puncture.	Rest, endocrine, assurance or reëducation.	Psychotherapy. Reëducation.

This matter is more fully gone into in my forthcoming book, "Disorders of the Nervous System in Warfare" (Blakiston).

Prognosis. The gravity of a commotion may be inferred in the first place from the history of the duration of complete unconsciousness; but only by objective findings can one decide upon the real gravity of the condition.

The most important of these are those found in the cerebro-spinal fluid. In the grave cases, besides neurological signs and hyperemotivity, there is an exudation of serum and occasionally lymphocytes, which may continue for months, and sometimes of blood. In cases less severe,

there is only a hyperalbuminosis with perhaps a diminution of chloride and an increase of sugar. In still less severe cases, the only physical sign is the increased pressure of the cerebro-spinal fluid. In this latter, the prognosis is quite favorable, and the patient should be able to return to duty before many weeks, quite restored; whereas, when there is hyperalbuminosis, some months may be required, and in the severer cases, when there is more, especially when there is a considerable amount of lymphocytes present, a year or more may elapse before the patient is even free from discomfort, and his serviceability as a soldier is

scarcely to be expected except in light auxiliary work.

Treatment. All observers have agreed that the best treatment consists of repeated withdrawals of cerebro-spinal fluid until the pressure becomes normal, along with prolonged rest and lacto-vegetarian regime. The most troublesome symptom after the first stages have passed is persistent and even very severe headache; sometimes there is a distinct slowing of thought for a considerable period, and there is always a loss of initiative and an absence of the sense of well-being. Dizziness and tinnitus are also frequent symptoms.

And in these cases usually there is a marked impairment of the vertiginous reaction to a galvanic current passed from ear to ear which should normally occur with a current of less than four or five milliamperes. In these cases a resistance may rise as high as 20 or 30. All of these are relieved by lumbar puncture.

CATAPHORETIC TREATMENT

A pad composed of sixteen layers of lint soaked in a two per cent. solution of salicylate of soda is applied to the forehead, care being taken that the pad is entirely wetted and that its centre coincides with the middle line of the forehead. Over the centre of the pad is placed a metal plate, and the whole firmly bandaged to the head. The metal plate is connected to the negative pole of the battery. A pad of the same thickness, about ten by six inches in size, is soaked in the water, covered with a metal plate and bandaged to the lumbar region. It is necessary that it should be bandaged very firmly, as a loose bandage may lead to a variation of the surface of pad in contact with the skin, due to respiratory movements, causing the current to vary and any rapid variation of the current passing through the head is very unpleasant to the patient. The current should be increased very slowly, taking about twenty minutes to attain to the maximum of twenty milliamperes, at which strength it is allowed to pass for twenty minutes, and then is very slowly reduced to zero. When passing the galvanic current through the head the current must be reduced much more slowly than when passing it through the other parts of the body—the reduction from twenty milliamperes to zero should not be completed in less than ten minutes.

Selected Paper.

A NOTE ON THE HISTORY OF EPIDEMIC ENCEPHALOMYELITIS.

BASED UPON A PAPER READ BEFORE THE ROYAL SOCIETY OF MEDICINE (SECTION OF THE HISTORY OF MEDICINE) JAN., 1919.

By F. G. CROOKSHANK, M.D., M.R.C.P., LONDON,

Physician to the French Hospital and to St. Mark's Hospital, London; Assistant Physician, the Prince of Wales' General Hospital, Tottenham.

"On l'a dit justement, les mêmes questions renaissent à chaque épidémie catarrhale, et leurs solutions diverses se reproduisent chaque fois à peu près les mêmes."
BOUVIER (*Ann. d'Hygiène Pub. et de Méd. Légale*, 1837).

THE clinical manifestations which of late years have become associated with the names of encephalitis acuta hemorrhagica, poliomyelitis, poliomyelitis, and so forth, have, there is little doubt, prevailed from time to time, during many centuries, in epidemic form.

The occurrences are not new; they have been described again and again in unmistakable language: but, since the overlying nosological, pathological, and etiological conceptions have been ever-varying, we have failed to recognize the historical continuity of the realities. The history of epidemic encephalomyelitis is, therefore, not that of "one disease," but of many; for what we call "diseases" are not natural objects, but conceptual.

We may indeed apply to encephalomyelitis in some degree the words employed by Michel Lévy, in the *Gazette Médicale de Paris*, for 1849, concerning cerebro-spinal meningitis:—

"... point une nouveauté: confondue avec les fièvres cérébrales, ataxiques, nerveuses: perdue dans les énumérations banales et dans les généralités graphiques des épidémistes et des chroniqueurs de la médecine: mêlée à d'autres épidémies plus considérables, comme le typhus, et rattachée à ses manifestations, à titre d'anomalie ou de variété anatomique... elle échappe à une détermination historique rigoureuse à cause de l'insuffisance ou de l'ambiguïté des documents, de l'absence ou de l'imperfection de l'anatomie pathologique."

Nevertheless, though like Lévy, we may not wish "nous exposer à juger aujourd'hui sous l'optique d'une préoccupation synthétique," we must, as did he when observing the almost