The Journal

OF

Nervous and Mental Disease

AN AMERICAN JOURNAL OF NEUROLOGY AND PSYCHIATRY

FOUNDED IN 1874

VOL. 55. JANUARY-JUNE, 1922

NEW YORK
64 WEST 56TH STREET
1922

ORIGINAL CONTRIBUTIONS

VOL. 55. JANUARY, 1922. No. 1

The Journal
OF
Nervous and Mental Disease

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Original Articles

THE PRESENT STATUS OF EPICRITIC AND PROTOPATHIC SENSIBILITY AND A METHOD FOR THE STUDY OF PROTOPATHIC DISSOCIATION

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The division of sensibility in the peripheral nerves made by Head and Sherrin (1) into three forms, viz., epicritic, protopathic, and deep, has been attacked from many quarters. The onslaughts for the most part have centered on that form of dissociated sensibility in which the epicritic elements are suppressed, the protopathic elements being retained with their well-known characteristics, viz.: sudden entry into consciousness, poor localization, wide radiation, overreaction, and inability to name the stimulus.

In the regeneration period after nerve section and suture Rivers and Head (2) found that this type of dissociation occurred as the result of the unequal rate of regeneration in two separate sets of systems, the one mediating the protopathic elements recovering function somewhat in advance of the set which mediates the epicritic elements.

The attackers,[1] chief among whom are to be mentioned Trotter and Davies (3) in England, and Boring (4) in America, have not

[1] Since the World War many articles have appeared in the literature attacking the dissociation hypothesis. A glance at these contributions shows that however useful they may be from the clinical standpoint, they fall far short of supplying a basis for scientific criticism of any theory of sensation. The only work so far submitted, in English and American literature, worthy of consideration in this respect is the work of Trotter and Davies and of Boring.

succeeded in disproving the dissociation hypothesis. Indeed when subjected to critical analysis the clinical studies of Trotter and Davies lend strong support to Head's main argument whilst the studies of Boring, notwithstanding somewhat extravagant claims on the score of introspective analysis, are grossly defective in many essential respects, not the least of which is an apparent predisposition to prove something against the dissociation hypothesis.

The writer has made numerous studies during the past decade upon regeneration in sensory nerves after all sorts of injury and has come to the conclusion that with some modifications Head's position, at least in regard to dissociation, is practically impregnable. The "protopathic stage" as Head calls it may not, it is true, always stand out without admixture of the epicritic elements. On this point Head's opponents, in the author's opinion, have achieved some success. The limits of the epicritic ranges for heat and cold are, moreover, not fixed and each of these forms seems to be an arbitrarily assumed entity since the specific element of heat (warmth) or cold, of all degrees, runs in a series that forms a continuum. Here again the attack of Head's opponents seems to have registered effectively. Spatial discrimination as tested by the compass points simultaneously applied is regarded by Head as the most delicate form of epicritic sensibility and the last of the "epicritic forms" to recover after nerve suture. Head's opponents regard this test as in reality a test for a form of deep sensibility and the author's studies (5). in which he made compass tests on the deep fascia of the thigh, show that, at least in part, this form of sensibility is mediated by infracutaneous mechanisms.

Head recognizes three forms of protopathic sensibility, pain (pricking), heat, and cold, each of which he regards as a simple entity. As a matter of fact, however, each of these, even when evoked by a punctiform stimulus, is a complex of hurtful (affective) and non-hurtful (critical) elements. Thus in certain dissociations the sharpness of pin-prick is shown to be an element separate and distinct from the *hurt* element since it may be preserved intact although the hurt element has been suppressed. And similarly warmth, and the specific sensation of cold, may be retained where the element of hurt or unpleasantness has been abolished. These forms of dissociation found by the author (5) in a case of syringomyelia show that the fundamental thing in protopathic sensibility is the *unlocalized, unmeasurable, uncontrolled hurt or affective element* (unpleasantness, change of state, etc.) as opposed to the *introspectively measurable,* more or less *well-defined sensation* of sharp-

ness or pointedness (e.g., of pin-prick), and of warmth and cold, each of which must be classed with the critical elements. Head's apparent failure to appreciate the significance of the dissociable elements found, even in what appears to be the simplest form of punctiform stimulation, has led him into a difficult maze of speculation. Thus he insists that once the peripheral nerves enter the spinal cord, i.e., at the first synaptic junction, epicritic and protopathic forms of sensibility are no longer encountered and yet in certain cases of syringomyelia the critical elements (pointedness and touch) of pin-prick may be retained unaffected, or but slightly impaired, where the affective (hurt element) is completely abolished. The similarity, moreover, between the type of sensibility retained in thalamic dissociation and that found in protopathic dissociation during the regeneration period after nerve section and suture is so marked as to warrant the conclusion that they are identical in nature as well as in the mechanism of their production, viz., abolition or impairment of function relative or absolute in the critical mechanism.

As the author (5) has pointed out, the dissociations encountered in syringomyelia and in thalamic dissociation clearly show that the critical pathways, both superficial (epicritic) and deep, retain their anatomical and functional individuality all the way from the periphery up to the thalamus. Head's contention, therefore, anent the intricate regrouping and integrations of afferent impulses, as one of the principal functions of the spinal cord, seems not only superfluous but in actual conflict with demonstrable facts. The sensation known as "heat" evoked by temperatures over 45° C. is a complex of the specific element *warmth* plus the affective element of *burning* or *stinging,* and each of these elements is dissociable from the other in both cord and thalamic lesions. Head nevertheless insists upon his epicritic form of heat in spite of the fact that in syringomyelia temperatures of 55° to 70° C. may evoke only the sensation of warmth. Cold is also a complex of the specific critical element *cold* plus the affective, unpleasant or hurt element and again the author has observed cases (unpublished) in which these elements were dissociated. The fact that cold is analgesic under certain conditions and algesic under other conditions seems to have baffled many observers including Head and Boring. Head makes a strong point of the pleasurableness evoked by warmth as indicating a specific form of protopathic sensibility but it has long ago been shown that stimuli otherwise painless or even agreeable becomes painful when their intensity approaches a degree that threatens tissue injury. Change of state is the fundamental thing in all stimulation and the exaltation

consequent upon activation of any function, within limits not antagonistic to well being, local and general, sufficiently explains the agreeable features of warmth. In thalamic dissociation the over-reaction to warmth is not an indication of an exalted specific form of protopathic sensibility. It merely represents the response to an innocuous stimulus where the affective mechanisms have been released from critical control which, as the author has pointed out (5), is exerted directly and mainly at the thalamic level, and not circuitously through the cerebral cortex as Head and Holmes (6) insist. It should be kept in mind that the thalamus mediates only the grosser affective elements and that even these may be in part mediated also by the inner layers of the cerebral cortex. In the course of its development the thalamus should not be regarded as an isolated entity but as closely related structurally and functionally with more primitive elements in the cerebral cortex. Of the epicritic and protopathic forms of sensibility laid down in the original classification of Head and his colleagues only one form remains as a distinct entity, viz.:— light touch, and attempts have been made to remove even this from the category in which Head placed it by Trotter and Davies who regard touch as merely dynamic contact and introspectively distinguishable from pressure or static contact. It seems, therefore, that after fifteen years of trial Head's classification has little to recommend it. In the author's opinion it has retarded rather than aided progress in the clinical study of sensation on account of the confusion it has caused in the minds of students and teachers alike not only because of its fundamental defects as a classification but also, in great measure, because of its formidable ill-fitting terminology.

In Head's classification no mention is made of deep protopathic sensibility although this latter is a commonplace of clinical study and is the form *par excellence* found in the viscera. Compare intestinal colic, testicular pain, etc. This is further reason why Head's classification should be dropped although the tests employed by him might with benefit be retained as in the author's classification (5) and perhaps be made the standard for sensory examinations in hospitals and private practice throughout this country. Head's failure to distinguish between the fundamental affective element in his protopathic sensibility and the critical or specific elements led him to speak of protopathic heat and cold as distinct forms of sensibility with the result that psychologists and clinicians, unable to verify his findings, or to harmonize them with well-established facts, have been led to deny altogether the existence of protopathic sensibility as a distinct form. Had Head not insisted too stringently upon the oc-

currence of a "stage" of protopathic sensibility and had he appreciated the fact that the common fundamental purely affective element underlies all his protopathic forms, giving in each instance enhanced vividness to the superposed critical elements, his work would have been almost beyond criticism. As it stands, its great merit consists in the demonstration after a cutaneous nerve injury of protopathic dissociation, i.e., abolition or impairment of sensibility for the critical elements, the affective elements being retained and exhibiting protopathic characteristics.

A glaring defect in our clinical methods of studying sensation and one often complained of by psychologists is the absence of any attempt at introspective analysis. But even the psychologists themselves seem to have grown timid on this subject and have failed for once to come to the aid of the clinician. The author has found introspective evaluation such an important aid to clinical study, even when the introspections are of the most elementary kind, that he ventures to set forth in detail the simple method he has found useful in unraveling the vexed problems of dissociated sensibility.

Method of Studying Protopathic Dissociation

In the regeneration period after injury or division of a peripheral nerve the protopathic type of dissociation is the one most usually encountered, whereas in spinal cord lesions, the dissociation best known to clinicians is of the critical type, i.e., in which the affective elements are abolished or impaired, the critical elements being retained. Compare the dissociation found in syringomyelia and related conditions. This reversal of type in the dissociation found commonly in spinal cord lesions as contrasted with that so commonly found in peripheral nerve injuries points clearly to two separate systems of pathways, one for impulses representing the affective elements, and another for impulses representing the critical elements. But the evidence for the existence in the peripheral nerves of these two systems does not rest merely on the occurrence of protopathic dissociation, since direct evidence of critical dissociation like that found in syringomyelia is found in certain cases after nerve injury.

Compare the Horsley case in which, after removal of a small tumor from the nerves at the base of the brain by Horsley, Head (7, p. 108) found sensibility absent for pricking and for 55° C. but preserved for light touch and 43° C. Compare also the "Triangle" in the Human Experiment (2) in which Rivers and Head found sensibility for pricking and for the affective or hurt elements of

heat (above 50° C.) absent, that for light touch and for the critical element (warmth) of 43° to 49° C. being preserved. Compare finally the case reported to the New York Neurological Society by Dawbarn and Byrne (8) in which after division and suture of the radial nerve in the upper arm sensibility for light touch and for the compass points simultaneously applied returned in a considerable area on the dorsum of the hand far in advance of that for pricking and for temperatures of all ranges.

In these cases it will be noted that sensibility was found present or absent for certain groups of critical elements (superficial critical stimuli) whereas, for the gross affective elements of pricking, of heat above 55° C., and of cold of all grades (superficial affective stimuli), it was found absent not *fractionally* as in the case of the superficial critical elements but as a *whole*.

The last link in this chain of evidence was supplied when the author (5) was enabled to show that in lesions such as tumors causing compression of the spinal cord, dissociation of the protopathic type was by no means of infrequent occurrence. In the spinal cord and peripheral nerves, therefore, it must be admitted that there are at least two separate and distinct anatomical systems of pathways for the conduction of afferent impulses. One of these systems mediates, the more or less unlocalized, unmeasured, uncontrolled *affective* or *quality* elements (hurt, pleasure, change of state) and the other the introspectively measurable, well-localized, controlling *critical* or *quantitative* elements (sharpness, size, shape, warmth, specific sensation of cold and spatial discrimination, posture, passive movement, etc.).

The affective system has its main terminus in the optic thalamus whereas the main destination of the critical system is the cerebral cortex. Compare Head and Holmes (6). Each of these systems conducts afferent impulses not only from the skin and superficial parts but also from structures that are deeply situated, such as muscles, tendons, etc.; and as each system of necessity has receptor mechanisms not only at or near the surface of the body but also in the deeper parts it seemed desirable to the author (5) for clinical, if for no other reasons, to further divide each of the great systems with reference to the location of its receptor mechanisms. This makes four separate sets of afferent pathways in the peripheral nerves, viz. (1) *superficial critical,* (2) *superficial affective,* (3) *deep critical,* and (4) *deep affective,* each set representing some more or less distinct phase of development of the sensory system. Each of these four sets of pathways remains separate and distinct

from the others, each retaining in the spinal cord, brain-stem and optic thalamus, its functional and anatomical individuality if not a spatial allocation that is grossly or microscopically demonstrable.

This simple classification has been found by the author to be of great practical aid in sensory studies. It seems especially well adapted for the brief summarization of sensory findings so essential for diagnostic purposes. It also supplies a satisfactory means of correlation between physiological and psychological data, emphasizing as it does the radical distinction between the *critical* or *intellectual* elements on the one hand and the *affective* or *feeling* elements on the other.

Under normal conditions each critical system or set of pathways functions in conjunction with the corresponding affective system, the former controlling the latter in the interests of the more complex, cognitive or reasoned methods of adjustment whereby, through experience, memory, judgment, etc., aided by the projicient receptor mechanisms (e.g., of vision, hearing, etc.), injurious objects may be avoided by locomotion without risking possible injury from direct contact, as opposed to the more primitive, unreasoning, instinctive methods of reflex withdrawal by shortening (flexion-reflex) after direct noxious contact.

Many observers have failed to convince themselves that protopathic dissociation occurs regularly after nerve injuries because they attempted to institute comparisons between threshold values obtained in each of the two great general systems, affective and critical, without realizing that in practice every stimulus, whether it be punctiform or areal, makes appeal in greater or less degree to both of these systems. This holds especially for stimulation tests made in the random method which Boring (4) in particular used. Thus in cutaneous hyperalgesia the lightest von Frey hair may evoke a sensation preponderately affective, viz., hurt as opposed to contact, whereas, under normal conditions pricking at a low pressure, e.g., 1.0 or 2.0 grammes, and in certain cases of syringomyelia even at a pressure of 37.0 grammes or more, may evoke a sensation that is preponderately critical, viz., sharpness (pointedness) as opposed to hurt. Introspective analyses based on methods of stimulation which do not take into consideration differences in threshold values dependant on the situation in relation to the body surface as well as upon the nature (i.e., whether belonging to the affective or critical system) of the receptor mechanisms stimulated can have little value in determining the presence or absence of dissociation of sensibility. The absence or impairment of sensibility as a whole for the critical as well as for

the affective elements must be established more or less accurately by the determination of threshold values but a reliable basis for the immediate comparison of threshold values obtained by stimuli that are preponderately *critical* with those obtained by stimuli that are preponderately *affective* is wanting. In the author's opinion the classification of the sensory pathways on the twofold basis, viz., (1) according to the nature of the elements which each system mediates, i.e., affective or critical and (2) according to the nature and location of the receptor mechanisms, i.e., whether superficially or deeply situated, is a distinct help in the study of dissociation since it serves to keep before the mind of the examiner the mechanisms to which each stimulus makes particular appeal. But no method is complete which does not make provision for introspective analysis in one form or another. The procedure which the author has found most serviceable in testing cutaneous sensibility consists first in marking off a definite area within the affected skin area and then applying affective stimuli in a random manner and recording the introspective evaluations for the *critical* and *affective* elements represented in each stimulus. The evaluations are so recorded that comparison of the state of sensibility presented by the affected area with that presented by a corresponding area of normal skin is possible on a quantified basis. This can be readily done by using + marks in the manner set forth below. When water at 50° C., in a silver test tube with a definite area of contact, is applied momentarily and lightly to the normal skin, e.g., on the dorsum of the hand, appeal is made to several types of receptors. The first sensation experienced is that of contact which is felt at once. Next in order warmth is felt and beneath this appears the hurt or affective element which is overshadowed by, and under control of, the two other (critical) elements. In conditions exhibiting defective critical sensibility the hurt element overshadows the critical elements (touch and warmth) with resulting overreaction. These two conditions of sensibility can be contrasted by setting down the introspective evaluations for the different elements of the stimulus 50° C. as follows:

Elements	Normal area	Affected area
Touch	+++	+
Warmth	++	+
Hurt	+	+++

The evaluations for cold at 20° C. may be similarly contrasted as follows:

Elements	Normal area	Affected area
Touch	++	+
Cold (specific element)	+++	++
Unpleasant feeling	+	+++

For pricking at 3.0 grammes, or more, pressure the evaluations might stand:

Elements	Normal area	Affected area
Touch	++	+
Pointedness (sharpness)	+++	+
Hurt	+	+++

In doubtful cases tables such as these emphasize at once the presence or absence of the subjective overreaction (hurt element, etc.) so characteristic of protopathic dissociation. In addition to the subjective overreaction set down in the tables, the presence or absence of other protopathic characteristics may be recorded such as objective overreaction (withdrawal), radiation locally of the stimulus effects, reference, persistence, poor localization and impaired ability to name the stimulus. Such a table showing the typical characteristics of protopathic dissociation, e.g., for heat at 55° to 60° C., might run:

Elements	Normal area	Affected area
Touch	+	○
Heat (warmth)	+++	○
Subjective over-reaction (hurt, etc.)	+	+++
Objective over-reaction (withdrawal)	+	+++
Localization	+++	+ or ○
Radiation	+	+++
Reference	○	+ or ○
Persistence	○	+
Ability to name stimulus	+++	○

It is well known that practice with any tests reduces the threshold value markedly in some instances even as much as fifty per cent. It is therefore advisable that in every case before testing, the patient should have some training in the threshold as well as in introspective studies so that in the final tests the answers may be promptly and spontaneously given. In the introspective tests each element should be reported in the order of its appearance and according to the degree of its intensity.

The applications of each stimulus may be few or many depending upon circumstances, the elements being evalued and charted according to the scheme just outlined. At the end of the examination the

average of the evaluations is determined for each element by dividing the total numbers of +'s charted for each element by the number of applications of the stimulus. In the final chart the averages for each element are set down against each other for comparison. By the aid of this simple method, elaborated and adapted to circumstances, the author has found no difficulty in demonstrating to his satisfaction protopathic dissociation not only after severe lesions of the peripheral nerves but also in spinal cord lesions and in the ordinary conditions in which pain is associated with minor grades of nerve injury of mechanical or chemical origin, e.g., contusions, infections, etc.

Many investigators have fallen into error by assuming that in order to obtain dissociation of sensibility one of the two chief sets of elements, i.e., critical or affective, must be completely suppressed as a whole whilst the other remains practically unimpaired. After section of a cutaneous nerve if stimuli, such as very heavy von Frey tactile hairs, be used, sensibility may be found but slightly impaired since such stimuli make appeal to the deeply situated receptor mechanisms of afferent paths that may not have been involved in the nerve section. Just such an error was made by Trotter and Davies (3) who relied on introspection to distinguish between dynamic contact (light touch) and static or pressure-contact (pressure-touch). No wonder these observers found that sensibility for critical and affective elements became restored simultaneously in the affected area after nerve section and suture.

The author believes that the time is ripe for clinicians to come to a more thorough understanding of the significance of the sensory tests. As at present made and recorded they are practically worthless and represent just so much waste of time and effort. Witness the summaries containing such expressions as "hypesthesia (or hyperesthesia below the level of the umbilicus." With our present knowledge of the multiple appeal of all kinds of stimuli, both punctiform and areal, and of the fundamental critical and affective components present in all forms of stimulation, it is amazing to find neurologists using such terms as hypaesthesia and hyperaesthesia to signify sensory impairment or exaltation. As such terms grossly misrepresent the actual sensory changes, they should have no place in our clinical histories or reports not to mention text-books. The employment of a method such as laid down in this paper would obviate all such difficulties and would give sensory tests a diagnostic value which under present methods they cannot possibly have. As

at present used by the majority of neurologists the sensory tests have little significance beyond the bare information that this or that form of sensibility is or is not lost or impaired. Interpretative evaluation is altogether missing. The method evolved by the author has, amongst other things, the great advantages that by it the sensory tests can be reduced to the extreme of simplicity so as to be available for the general practitioner in routine clinical examinations and for the neurologist's hurried preliminary or diagnostic examinations as opposed to the later, more painstaking examinations made possibly with a view to research. In the four divisions of the author's classification, viz., (1) superficial critical, (2) superficial affective, (3) deep critical, and (4) deep affective, only one type of stimulus need be selected as representative of each division. Thus taking light touch (cotton or the finger tip) as representative of superficial critical stimuli, pin-pricking of superficial affective, posture and passive movement of deep critical, and pressure-pain (pinching, etc.) of deep affective, we have a means of making a rapid sensory examination which, from the point of view of interpretative evaluation, far excels the majority of sensory examinations as at present made even by otherwise skilled neurologists. This simple plan calls for just four sensory tests, viz., light touch, pin-pricking, posture and passive movement, and pressure-pain, all of which can be made in a few moments without the use of instruments other than an ordinary pin. Hitherto, thanks to the failure of teachers of neurology to appreciate their significance, the sensory tests have been made a sort of Chinese puzzle for the general practitioner and as a conseqeunce have been generally so far overlooked in routine examinations, inside and outside of our hospitals, as to find no place in the clinical records. The method here offered to the profession should mark the beginning at least of a movement in the direction of clinical progress.

Conclusions—(1) The division of sensibility into epicritic, protopathic and deep is incomplete and misleading. (2) The terms "epicritic" and "protopathic" in the sense in which Head, their originator, uses them, that is as including so many distinct forms of sensibility, are arbitrary and misleading and should be discarded. (3) The clinical study of sensory defects in addition to threshold tests should include some attempt at introspective analysis without which the various types of dissociated sensibility are likely to be overlooked. (4) Some simple standardized form or chart for the

clinical study of sensory defects should be adopted in the hospitals and medical schools throughout the country.

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A CORRELATIVE STUDY OF ENDOCRINE IMBALANCE AND MENTAL DISEASE

By Nolan D. C. Lewis and Gertrude R. Davies

(*Continued from p. 512*)

Case 18. American, male, aged thirty-eight, single, seaman.

Mental Diagnosis. Schizophrenia with paranoid development.

Endocrinosis. Hyperthyroidism associated with pituitary disfunction.

History.—He was brought up in a tough district of a great city. He always felt inferior as his frame was small and his bones delicate like a girl's. At school he did poorly and wanted to cry in shame when pupils surpassed him.

He saw negro boys commit pederasty when he was twelve, and he had his first heterosexual experience at this age. He early learned to be on his guard against perverts. He first worked as a cash boy in a store but people teased him and he quit. He tried other jobs and night school but couldn't get on anywhere.

At nineteen he had his only love affair but he felt inferior, as if he should step aside and let some superior fellow win the girl, so he withdrew, and wandered over the country from job to job. He wanted to see the world.

At twenty-two he joined the Navy and reenlisted three times. Between each enlistment he roamed around a while in civil jobs. In the Navy he learned there were two classes of men, those who stood up for their rights and those who gave in. He noticed that perverts belonged to the soft, easy going type. He could always mimic girls and women and in fancy dress could pass for a girl, but it was dangerous to do so for some men might jump to the conclusions that he was a pervert. He felt less strong and athletic than some fellows on shipboard, and was always on his guard lest others should suspect him of being a pervert. He trained himself to resent instantly any aggression.

He kept a good deal to himself and felt lonely. He communed with himself and finally heard voices. They talked to each other, and he listened or sometimes he joined in the conversation. It was a comfort in his loneliness. The voices said he held communion with God. It had been noticed on shipboard for a long time that he had queer beliefs, but his behavior remained good and he did his work. He knelt like a fire worshiper and made obeisance to his cigarettes. One day he rushed into the captain's cabin and delivered a message he had received from God through his mother as to the course the ship should take.

He was sent to St. Elizabeths. He had hallucinations, was talkative, very argumentative, emotionally unstable, and very suspicious. He had no insight and considered himself an object of persecution, and tried to reason out why.

He was too suspicious and resistive to enter our ward until May. We were then able to win his confidence partially. He was still pretty suspicious and looked about the office for a dictaphone. He believed in his delusions and felt bitter over his incarceration. He would harangue for hours about his grievances and felt we were not sympathetic enough over them. If he had been a pretty girl, he said, we would have paid more attention to his troubles. He was extremely conceited and thought he knew more than any of the physicians.

Gradually he talked of his hallucinations. The voices at first had been insulting and knew all his sins. He could hide nothing from them, so he had confessed all to them and made peace with them, and then they became friendly and talked on pleasant subjects. When we tried to explain these spirits inside him as splits of his own mind, he said he could not believe it for they often told him interesting things that he was sure he had never known before. He admitted, though, that while at first they came from a distance he had gradually pulled them inside his head, and could now turn them off and on at pleasure. He could thus control them, and looked on them as seven spirits inhabiting one body.

He did not consider it desirable to unite them into one mind as we advised for it was so interesting and comforting to have them talk when he was lonely. He wouldn't want to lose them any more than a father would wish his children to die. He composed a poem called "Babies in Fairyland."

Since he was reluctant to give up his schizophrenic conversations we urged that he pay close attention to his behavior and make sure that it harmonized with the ideas of society, and that if his behavior

was acceptable nobody would bother much about his beliefs. He grasped the point readily and admitted that his rushing with his divine message to the captain was a great mistake, and that he would be very careful in the future to do nothing that would meet with disapproval.

In July after three months' treatment the ward nurses reported that his disposition had greatly improved, he was agreeable, cheerful, and worked well, argued no more, said nothing about his former supernatural beliefs, but laughed over some of them, and kept much to himself, and read books on science and art. It was noticed he disliked women. He felt able to earn his own living outside and was hopeful of soon regaining his freedom.

OUTLINE OF CASE 18

Mental	Physical	Laboratory
A believer in occultism and Divine healing.	Slender type of skeleton.	Wassermann negative.
Visual and auditory hallucinations.	Skin smooth, dark brown over entire body.	Blood pressure $\frac{138}{80}$.
Effeminate nature.	Hypertrichosis.	Blood uric acid 0.85 mg.
Argumentative.	Front teeth protruding outward from alveolar process.	Blood urea 22 mg.
Ideas of persecution.	Hyperhydrosis.	Blood creatinine 2.6 mg.
Systematized delusions.	Positive Vigoroux sign.	*Thyroid function test:* Moderate hyperthyroid reaction.
Resistive.	Tremor of fingers.	*Sugar tolerance test:* Delayed absorption phenomena.
Feelings of influence.	Reflexes all hyperactive.	
Auditory hallucinations, at first unpleasant, later pleasant and controllable.	Eyes protrude distinctly.	
Read many books on mysticism and hypnotism.	Pupils dilated and active.	
Received many messages from dead statesmen regarding state affairs, and tried to communicate these to present officials.	Mild tachycardia.	
Disliked feminine sex.	Thyroid gland slightly enlarged.	
At times arrogant and overbearing.		
Very industrious.		
Periodically combative.		
No insight.		
Delusions of grandeur.		

Patient was placed on suprarenal gland and has improved remarkably both physically and mentally under this treatment. Most of his delusions have disintegrated and constellated about more useful activities and he is developing more and better insight into the previous peculiar experiences. He no longer expresses ideas about his mediumistic abilities, and his general attitude is one of cheerful

industry. He looks upon his psychosis as a peculiar experience through which he has passed and recognizes it as an abnormal development. He has lately been discharged as a recovery.

CASE 19. American, male, aged twenty, single, stenographer.
Mental Diagnosis. Schizophrenia with projection.
Endocrinosis. Hypothyroidism.

History.—His father is a psychopath and his mother a timid little woman who tried to shield her boys from their father's wrath during his excitements. The patient is the youngest of five sons and was always the mother's pet. An older brother also petted him a great deal. He was a timid reticent boy and seldom mingled with other children unless drawn out by his brothers. He sucked his fingers till he was twelve, and slept with his mother until puberty or later. Both he and she were leagued together against the father. Only once did he oppose his father's will and that time the latter chased him off the place with a revolver.

He reached the eighth grade in school at eighteen. He played hooky a good deal and roamed in the woods with another somewhat older boy. He admitted masturbation and an attempt at coitus when he was twelve. After puberty he grew very shy and avoided girls entirely. The brothers were affectionate among themselves and liked to wrestle, caress, and kiss each other. It was noticed that patient gradually grew resistant to caresses from the brothers and particularly from his mother. Toward her he wavered between demonstrative affection and irritable aversion. He admitted that he had had mother incest dreams, and then immediately denied it.

After leaving school he went to work in the city, rooming with a brother. He liked to imagine himself a character in boy books of adventure. He did poorly in his work and finally became very frightened, fearing people wanted to kill him. He also spoke of voices. He stopped work and hung around home getting untidy and sleeping on the floor. He would run away for a few days and return disheveled and famished. He could not concentrate on anything but wandered away into smiling fantasy. He carefully guarded his inner life and made a confidant of nobody. After two years in a state hospital where he worked on the farm, he was brought to St. Elizabeths.

His mind seems perfectly clear and he gives no evidence now of harboring delusions or fantasies or even enjoying his thoughts. He sits or lies around the ward and will work but little. He seems fearful that someone may hurt him but won't explain just what he fears.

He is extremely reticent and will not talk frankly even to his family. He lies up and down and cannot be trusted. At every opportunity he escapes. When shut up in well guarded less desirable wards he begs to be transferred to an open ward, promising not to run away again and then breaks his word at the first opportunity. He bitterly resents being confined in an institution, and his main idea is to get out. He is keen enough to know what symptoms the ward physicians are on the lookout for, and carefully hides them.

When his parents visit him it is plain to see he prefers his father in spite of the past. He begs for money and candy like a child.

Owing to his refusal to talk with me we tried the word association test. He suspected no ulterior motive here and cooperated, but afterwards refused free associations to complex indicators. These were eye, lips, mouth, tongue, suck and swallow; dirty, slimy and dog; woods and bushes; jealous, enjoy, lazy, observe, work, sick, mother, sleep, dead, marry, pity, yellow, failure, ball, kiss, forget, voices, blood, secret, spit, kill and murder.

OUTLINE OF CASE 19

Behavior	Physical	Laboratory
"Shut in" type of childhood.	Medium size.	Wassermann negative.
Truant and "fuge."	Skin dark and covered with small scales.	Blood pressure $\frac{132}{78}$.
Chronic masturbator.	Axillary and pubic hair scanty.	Blood uric acid 1.56 mg.
Roamed about by himself.	Extremities cold and bluish.	Blood creatinine 1.48 mg.
Never liked work—had numerous jobs but never kept them.	Sluggish circulation.	Blood urea 16.6 mg.
Day dreamer.	Slow pulse.	*Thyroid function test:* Typical hypoglandular tolerance.
Fear obsessions.	Subnormal temperature.	*Sugar tolerance test:* Increases sugar tolerance.
Previous State Hospital record.	Reflexes active.	
Numerous escapes from hospital.	Thyroid gland very small.	
Dislikes to answer questions—secretive.	Constipation.	
Denies hallucinations, but there is some evidence of their presence.	Exophthalmos.	
Childish in tastes.	Hyperhydrosis.	
Sits about the ward quietly all day with an alert facial expression.	Awkward gait.	

This patient showed very little improvement on small doses of thyroid gland but he was somewhat more active physically which made him more difficult to handle, and his escapes from the hospital were more frequent.

CASE 20. American, male, aged thirty-nine, married, laborer.
Mental Diagnosis. Schizophrenia with projection.
Endocrinosis. Hypothyroidism.

History.—A badly deteriorated patient who has been in the hospital nine years. His history had to be gleaned from the records. They state that his family history is negative. He attended school from six to fourteen, and failed in the sixth and seventh grades. He married at twenty-four and had no children. His wife lived with him less than three years. For seven years he had ground lenses in an optical shop at low wages, but was discharged because he continually quit work early to spy on his wife. He was extremely jealous and suspicious of her and accused her of having sexual relations with any man in the environment. He rapidly deteriorated, working as elevator man or park laborer until he was committed.

Buzzing voices annoyed him. Some told him to do right, others called him vile names. He thought his wife's mother poisoned his food and that her brother wanted to kill him. He was restless, suspicious, absorbed in his own thoughts but didn't see why he was considered insane. He denied venereal disease or perversions.

When admitted to our ward almost all his time was spent in fantasy. It was both pleasant and unpleasant. He was very erotic, securing pictures of women, talking to and kissing them, laughing delightedly and taking them to bed with him. He masturbated in the toilet many times a day. His most annoying fantasy was that he was being "turned over" (probably a passive pederasty idea). "Action on the human body is an offense to the law, and I'm a married man." His good days were those in which he was not "turned over" so often.

When these unpleasant thoughts came into his mind he went into violent tics, nodding his head up and down, winking his eyes and smacking his lips loudly. Frequently he reiterated neologisms like "glahba—glahba—glah," in great annoyance. In bed at night he went through noisy fights with temptation ending in masturbation and sleep. In these struggles he talked of normal coitus, cunnilingus, anal licking, and bestiality. Sometimes he leaped out of bed, his fists fanning the air at some imaginary enemy.

When he attempted to explain anything his language was so unique, with familiar words used to denote special meanings of his own that it was practically unintelligible to anyone else. He liked to play cards and ball but could only concentrate for a short time, being likely to go off into fantasy at any moment. He could not

concentrate enough to learn even the simplest weaves in occupational work.

After glandular therapy nurses and attendants thought they saw some slight improvement. He became neater, quieter, somewhat clearer in his talk, had fewer disagreeable fantasies with their accompanying tics, and masturbated less. During the final two months he ceased masturbating altogether. There was no marked change in his ability to concentrate. He was still unable to learn well any task in occupational work.

OUTLINE OF CASE 20

Behavior	Physical	Laboratory
Extremely jealous. Suspicious of wife's fidelity. Auditory hallucinations. Delusions of poisoning. No insight. Fantastic thinking. Extremely erotic. Many active facial tics. Unable to learn basket weaving. Converses with unseen persons. Threatens imaginary enemies. Restless and excited. Sometimes polite and pleasant. Frequent grimaces and gestures. Enjoys wrestling, base ball and other exercises. Daily masturbator. Fairly industrious on ward. Noisy at night. Frequent smacking of lips and grunting laryngeal sounds.	Slender skeleton. Beard slight. No hair over body. Hair of head dry and brittle. Trophic changes in nails. Skin dry and scaly over knees and elbows. Extremities cold, bluish. Papular skin eruption over face, neck, and chest. Many pigmented moles over body. Numerous tics. Bradycardia. Heart sounds accentuated. Subnormal temperature. Slight arteriosclerosis. Features of senile decay. Anhydrosis. Muscles easily fatigued.	Wassermann negative. Blood pressure $^{105}/_{70}$. Blood uric acid 2 mg. Blood urea 30 mg. Blood creatinine 2.45 mg. *Thyroid test:* Typical hypothyroid reaction. *Sugar tolerance test:* Typical hypoglandular absorption curve.

After being placed on regular doses of 1 grain thyroid gland twice daily, the patient became more quiet, stopped smacking his lips, and stopped masturbating entirely. He also became extroverted, more industrious about the ward and carried out orders accurately. The skin lesion has melted away, his personal appearance has changed in that he is better nourished and is more tidy in habits and clothing.

CASE 21. Polish, male, aged twenty-eight, single, laborer.
Mental Diagnosis. Schizophrenia with catatonia.
Endocrinosis. Hypothyroidism.

History.—A paternal uncle drank and committed suicide. The patient was a sickly child. At eighteen he emigrated from Poland to the United States and worked for low wages in factories and founderies. In the last place it was too hot and he noticed the other men were jealous of him because of his good work. He thought his food was poisoned and complained to the police.

To escape from the unpleasant situation he enlisted in the army, two months later. Then after two months he was sent to hospital because he made silly grimaces and talked to himself. Voices called him bad names and he felt everything was all mixed up. Later he went into a catatonic stupor and had to be tube fed.

At first he crouched around all day, eyes closed and fingers in ears. He would push away or strike at anyone who disturbed his revery. He seemed happy and gave no signs of mental conflict.

After glandular therapy began he grew more restless and wandered about as if extroverting in spite of himself. Gradually he paid more attention to the environment. A Polish nurse got him to answer a few questions in his mother tongue.

OUTLINE OF CASE 21

Behavior	Physical	Laboratory
Early delusions of poisoning.	Medium sized skeleton.	Wassermann negative.
Occasional silly grimaces and gestures.	Pale smooth skin.	Blood pressure $\frac{140}{80}$.
Auditory and visual hallucinations.	Entire chest and abdomen covered with long matted hair.	Blood uric acid 2.32 mg.
Crouching body attitude, eyes closed, and fingers in ears greater part of time.	Mammary glands enlarged.	Blood urea 18 mg.
Would strike out when disturbed.	Abdomen very prominent.	Blood creatinine 3.50 mg.
No speech activities.	Muscles universally weak and flabby.	*Thyroid test:* Hypoglandular type.
Occasional catatonic stupor with tube feeding.	Ligamentum nuchae over developed.	*Sugar tolerance test:* Low initial blood sugar with rapid absorption.
Negativistic and waxy flexibility.	Lips large pouting and in constant motion.	
Untidy—pays no attention to condition of clothing.	Mitral systolic murmur.	
Occasionally restless walking to and fro.	Pulse slow, weak and irregular.	
Admires himself in mirror several times daily.	Pupils small—react sluggishly.	
Swallows food in large bolus without chewing.	Corneal reflexes reduced.	
Kicks attendants.	Reflexes all sluggish.	
	Anhydrosis.	

By June he no longer hung his head or closed his eyes and ears. He would do some basket weaving or make a bed and obey orders generally. He looked more alert, did not fight people off, and told the Polish nurse he wondered why he was here.

He became more active during the test, began rapid stereotyped movements of the lower extremities and walked around a great deal more than usual. After being placed on one grain of thyroid gland three times daily, he began to talk some Polish and swear in Polish at his attending nurse. He had a peculiar type of behavior when extroversion began in that he would often awaken from his introverted state, with wide open eyes staring about the ward as though surprised at his surroundings. Soon he began to make baskets, polish floors, shake hands, and exchange greetings. General mental and physical improvement has been remarkable.

CASE 22. American, male, aged thirty-two, single, no occupation.
Mental Diagnosis. Schizophrenia with introversion.
Endocrinosis. Hypothyroidism.

History.—His parents, older brother and sister are living and well. There is no insanity in direct line but some cousins are insane. He was always quiet and shut in. In school he was bright, once even skipping a grade, but he left when in the sixth grade because the teacher unjustly accused him of throwing a spitball. He worked in the family grocery store for three years, then as a machinist.

At seventeen he quit work and remained at home for fifteen years until admitted into the hospital. In the beginning he helped a little around the place and went with one boy friend. He never asked for money and cared nothing for theaters or movies, but read omnivorously, having apparently no preferences.

Six years ago he refused to eat for a while and was confined to bed. Since then he has done no work whatever, except cook his own food, about which he was very finical. He gradually grew untidy, let his hair grow down to his shoulders, refused to change his clothes or bathe, became more irritable, smashed dishes and threatened his family.

In the hospital he submitted to authority and was bathed, shorn, and dressed neatly. He complained of feeling cold and weak and said he had worn his hair long as a protection again the cold. He jealously guarded his inner life and quietly resisted any questioning. He admitted he had always found it difficult to make conversation and had been bashful, and that his thoughts were not unpleasant. He had no plans and took each day as it came.

He lay and sat around the ward, refusing to join in any occupation, saying he felt tired. Occasionally he would talk to himself about having to support his family and not earning enough. In fantasy he compensated for his fifteen years sponging on them. He had a strong sexual taboo, refusing any information, but stated once that he considered night emission shameful, just like urinating in bed. His behavior indicated no hallucinations or delusions beyond his seeming belief that he had supported the family.

Coincident with the beginning of glandular therapy he consented to try basket weaving. He showed more energy and stopt lying on his bed by day. He became more cheerful, showed some interest in his work and did it without urging. He still kept by himself, refused to mingle with other patients, and talked to himself, resenting his family's sending him to the hospital and depriving him of freedom and the opportunity to earn money. The earning of money seemed to be his chief preoccupation.

OUTLINE OF CASE 22

Behavior	Physical	Laboratory
Shut in type of boyhood.	Slender type of skeleton.	Wassermann negative.
Good scholar.	Pale—slightly scaly skin.	Blood pressure 120/40.
Omnivorous reader.	Few long hairs about nipples.	Blood uric acid 1.60 mg.
Periodic abstinence from food.	Scanty body hair and none over the face.	Blood urea 16 mg.
Untidy in person and clothing.	Reflexes slightly subnormal.	Blood creatinine 3.05 mg.
Bashful — day dreaming makeup.	Extremities, damp, cold and cyanotic.	*Thyroid test:* Hypoglandular reaction.
Well developed sexual taboos.	Pulse 78.	*Sugar tolerance test:* Hypoglandular type of absorption.
Slight evidence of hallucinations.	Mitral systolic heart murmur.	
No delusions.	Subnormal temperature.	
Quiet and motionless usually.	Fatigue without energy expend.	
Assists somewhat in ward duties.	Chronic constipation.	
Talks sometimes to himself.		
Answers questions correctly and converses connectedly.		
Mild and obedient.		
Shuns society as much as possible.		

This case was diagnosed dementia praecox, hebephrenic type and had been idle and unproductive for six years. During the thyroid test the patient began work and has shown notable improvement both mentally and physically. He has been on thyroid gland 2 grains daily for two months during which time he has been ener-

getic, works without being invited to, habits are neater than before, pays more attention to personal appearance, sleeps better and has gained in weight.

IV. Discussion

As is usual in endocrine symptomatology many of the above physical signs are interpreted as indicating pluriglandular involvement, but it was thought advantageous to limit the general diagnostic headings as far as possible to single term expressions representing the main glandular picture.

In Table I, where the laboratory findings are arranged according to the type of endocrinosis, it is noted that as in other groups of mental diseases (12) there are very few deviations from the average content in uric acid urea and creatinine; with the possible exception of the urea which in general has given higher values throughout; but in the sugar tolerance and thyroid tests there is an indication that we have valuable diagnostic aids in determining the type of glandular response.

Table I

Results of Laboratory Examinations

Case	Mg. per 100 c.c. Blood			Sugar Tolerance	Thyroid Test	Endocrinosis
	Uric Acid	Urea	Creatinine			
4	1.80	14	1.55	Increased	Hypoglandular	Hypothyroidism.
5	1.45	22	2.30	"	"	"
6	0.80	16	1.50	"	"	"
7	2.00	18	3.00	"	"	"
10	1.40	22	1.60	"	"	"
11	1.00	24	3.60	"	None	"
14	0.90	26	2.00	"	Hypoglandular	"
15	0.80	16	1.20	"	"	.
19	1.56	18	1.45	"	"	"
20	2.00	30	2.45	"	"	"
21	2.20	18	3.50	"	"	"
22	1.60	16	3.00	"	"	"
2	1.50	36	2.82	"	"	Polyglandular.
17	1.00	22	2.50	"	"	Hypopituitarism.
12	1.80	18	1.50	Atypical	"	Dispituitarism.
3	1.00	16	1.20	Increased	"	Periodic hypoadrenia.
13	1.83	15	2.86	"	None	Periodic hypoadrenia.
9	1.40	16	2.50	Prolonged curve	Hypoglandular	Mixed thyrotrophic.
1	2.60	36	2.50	" "	Contraindicated	Exophthalmic goitre.
8	1.80	27	3.20	" "	Hyperglandular	Hyperthryoidism
16	2.40	20	1.92	" "	"	"
18	0.85	20	2.60	" "	"	"

Considering the sugar tolerance test there is the "prolonged

curve" or delayed absorption reaction in the four hyperthyroid patients (cases 1—8—16—18) only one of which has an exophthalmic goitre. The only other hyperglandular sugar response is a pluriglandular condition (Case 9). Figure one illustrates two of

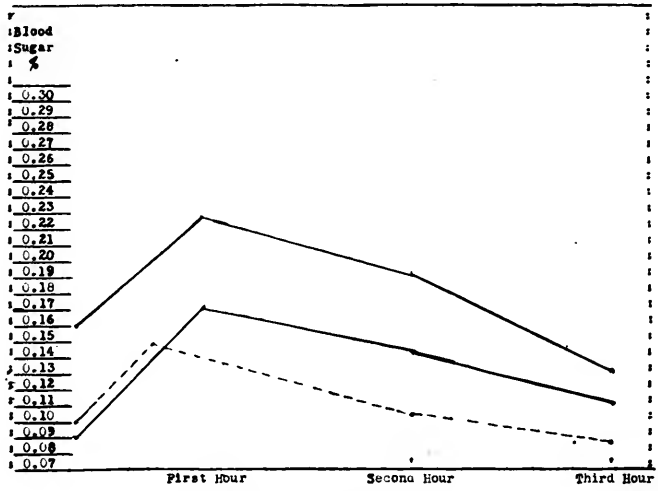

FIG. 1. Hyperglandular sugar tolerance curves.

Interrupted line = Normal.
Upper curve = Hyperthyroid with manic reaction (shows initial fright) (Case 8).
Lower curve = Exophthalmic goitre (Case 1).

these hyperglandular curves which are quite typical of the response. The upper curve shows a high sugar content at the first determination which has been a frequent finding in those patients responding to the situation with extreme fear (13). In both curves the blood sugar is still high at the second and third hours.

In the twelve cases of clinically diagnosed hypothyroidism the sugar tolerance is increased in each, and this hypoglandular reaction is also present in the two hypoadrenias (cases 3 and 13), one hypopituitary (case 17), and in the one polyglandular type (case 2). In the case (12) of epilepsy with pituitary disturbance the curve is atypical being high at the first hour and dropping rapidly. Figure 2 illustrates two of the average hypoglandular or increased tolerance curves. Although the number of cases is small from the above findings one is certainly justified in giving the sugar tolerance test an important place in the analysis of these often difficult cases. Wilson (14) found the test very useful in indicating the value of x ray treatment in hyperthyroidism. It was proven experimentally

by Janney and Isaacson (15) that hypoglycemia results from hypoendocrine functions and develops regularly after thyroidectomy. Low blood sugar values have been reported in other hypoendocrine diseases.

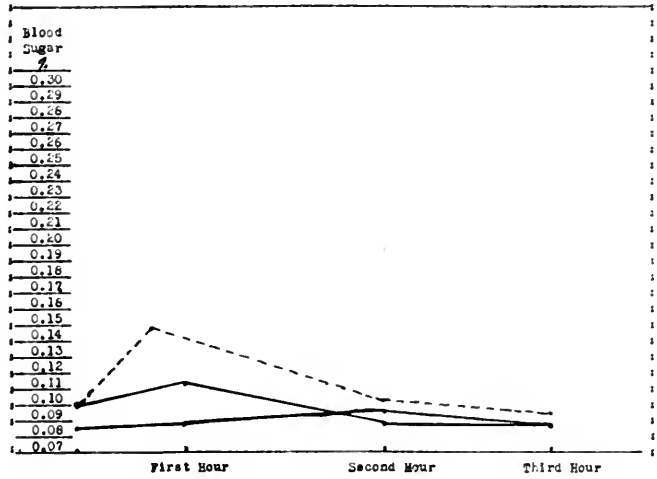

FIG. 2. Typical hypoglandular sugar tolerance curves.

Interrupted line = Normal.
Upper curve = Hypoadrenia with schizophrenia (Case 3).
Lower curve = Hypothyroidism with projection (Case 4).

There are certain contraindications and conditions which may invalidate the test by affecting the absorption rate; some of those are irritable stomach in neurotic states (persistent vomiting of the sugar solution), grave gastroenteric diseases (producing delayed

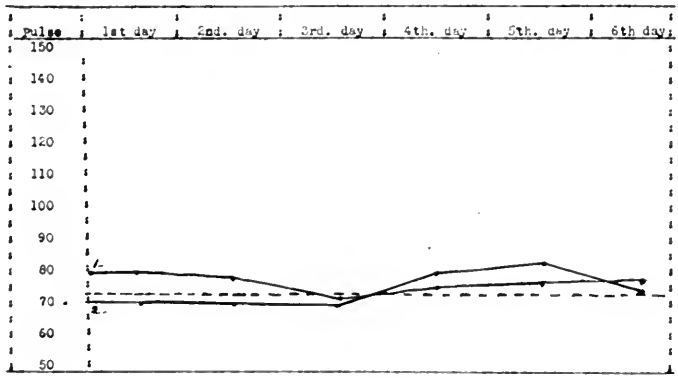

FIG. 3. Thyroid Test: Hyperglandular curves.

Upper curve = Hyperthyroidism with manic features (Case 8).
Lower curve = Hyperthyroidism with schizophrenia (paranoid) (Case 16).

absorption) and extensive ulcerations or adhesions interfering with normal peristalsis.

The thyroid tests are of the hyperglandular type in three of the four hyperthyroid cases, the test being contraindicated in the other because of the usual extreme acceleration in Basedow's disease (Fig. 3) gives two examples of the hyperglandular reaction with the pulse remaining high for two days after terminating the administration of the test capsules.

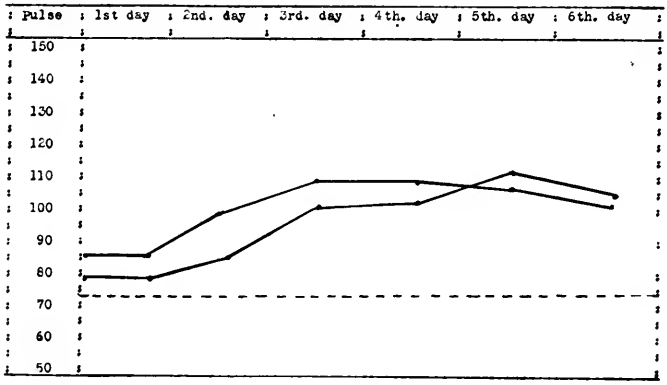

FIG. 4. Thyroid Test: Hypoglandular curves.

1 = Case 17—Hypopituitarism with schizophrenia.
2 = Case 14—Hypothyroidism with schizophrenia.

In the normal individual the thyroid feeding on the day when the largest capsules are given, stimulates the thyroid and through it the heart rate, so that we get the increase in pulse rate which being due to the administered extract comes back to normal the day after the capsules are stopped. However, if the individual is in some degree hyperglandular according to susceptibility and the amount of circulating hormone the pulse rate will increase early in the test and reaches a high level (often high enough and with associated phenomena to necessitate termination of test) which persists for two or three days after administration of last capsules.

The hypoglandular constitution, on the other hand, scarcely reacts at all, and in many cases practically no change is seen in the pulse rate; the tissues are sluggish and in need of acceleration. Figure 4 illustrates two hypoglandular curves (Cases 17—14) to which general type eleven of the twelve hypothyroid cases belong. The remaining hypothyroid patient because of some delusion refused to cooperate (Case 11). The remaining six cases (hypoglandular and mixed types) excepting one (Case 13) in which there was a contraindication give the hypoglandular reaction.

In many of the sluggish and apathetic individuals with introversions a change in behavior often with marked temporary improvement occurs during the three day feeding of thyroid, and it has been discovered that regardless of the main type of hypofunction, the preliminary administration of thyroid gland over a period enhances the action of the pituitary, suprarenal or other glands to be given later (16).

The principal contraindications of the thyroid function test are frank Basedow's disease, manic or anxiety conditions, with rapid heart and great excitability, and advanced valvular heart diseases.

In Table II where a comparison is made of the psychoses, and endocrinoses with duration of treatment and results, it is seen that although the selection of cases was made on the endocrine basis and includes several types, the mental construction is that of schizophrenia in some form.

Phillips (17) found twelve per cent. of two hundred patients with mental disease to be hyperthyroid, seventeen of the number suffered from an affective reaction type. In our small group the hyperthyroid patients were all schizophrenics with projection and paranoid features. Phillips feels that hyperthyroidism is usually associated with states of excitement, agitation, etc., while hypothyroidism is more often found in states of apathy and introversion, as compared with the usual reports on glandular therapy the periods of treatment are very short, and the recorded results which are based on them should be interpreted in terms of possibilities rather than in permanent achievements.

The psychoses of the four mental recoveries were of short duration, but were unmistakable schizophrenia (two of which were paranoid in type).

Eight patients with psychoses ranging from nine to two and one half years in duration are benefited physically and mentally. Seven patients are improved physically, but show changes in behavior not recorded as improvement. Two patients, who did not receive treatment, for reasons mentioned in the history, are not changed physically or mentally and one improved somewhat mentally, but not physically.

It is well to state that the above physical and mental results, changes in behavior, etc., are not recorded on the opinion of one individual, but are taken from the written unanimous reports of three physicians, an occupational therapist, and two trained nurses.

TABLE II

COMPARING DURATION OF PSYCHOSES WITH TREATMENT AND RESULTS

Case	Psychosis	Approximate Duration	Endocrinosis	Duration Treatment	Results	
					Physical	Mental
1	Schizophrenia (projection)	9 years	Hyperthyroidism	Operative	Improved	No change
2	Schizophrenia (projection)	10 "	Polyglandular	None	None	None.
3	Schizophrenia (circular)	5 "	Periodic hypoadrenia	1½ months	Improved	None.
4	Schizophrenia (projection)	2 "	Hypothyroidism	5 "	Improved	Improved.
5	Schizophrenia (projection)	9 "	Hypothyroidism and hypoadrenia	4 "	Improved	Improved.
6	Schizophrenia (projection)	8 "	Hypothyroidism	4½ "	Improved	Improved.
7	Schizophrenia (introversion)	3 "	Hypothyroidism	4½ "	Improved	Improved.
8	Schizophrenia (affective features)	1½ "	Hyperthyroidism	3 "	Improved	No change.
9	Schizophrenia (paranoid)	5 "	Mixed thyrotrophic	1½ "	None	Improved.
10	Schizophrenia (projection) on Moron basis	1 "	Hypothyroidism	4 "	Improved	Recovery (discharged)
11	Schizophrenia	1½ "	Hypothyroidism and hypoadrenia	None	None	None.
12	Schizophrenia (defective epileptic basis)	4 "	Dispituitarism	2½ "	Improved	None.
13	Schizophrenia (affective features)	2½ "	Periodic hypoadrenia	3½ "	Improved	Improved.
14	Schizophrenia (projection)	7 "	Hyperthyroidism	4 "	"	No change.
15	Schizophrenia (paranoid)	2 "	Hypothyroidism	4 "	"	Recovery (discharged)
16	Schizophrenia (projection)	2 "	Hyperthyroidism	2 "	"	None.
17	Schizophrenia (projection Moron basis)	1 "	Hypopituitarism	4 "	"	Recovery (discharged).
18	Schizophrenia (paranoid)	1½ "	Hyperthyroidism	3½ "	"	Recovery (discharged).
19	Schizophrenia (projection)	3 "	Hypothyroidism	2½ "	"	None.
20	Schizophrenia (projection)	10 "	Hypothyroidism	3 "	"	Improved.

Case	Psychosis	Approximate Duration.	Endocrinosis	Duration Treatment	Results	
					Physical	Mental
21	Schizophrenia (catatonia)	4 "	Hypothyroidism	3½ "	"	"
22	Schizophrenia (introversion)	6 "	Hypothyroidism	2 "	"	"

V. Conclusions

1. Since the activities of the nervous system, and particularly those of the autonomic divisions are closely associated with endocrine functions, one must suppose that maladjustments of the individual to certain situations will produce a response in the glands varying according to the strength of the impulse, development, vigor, and physiological activity and balance existing between the component parts of the gland and on the other hand, original defects in these glands connected as they are with external form, and visceral and metabolic functions must produce limitations in the action systems and peculiarities of behavior.

In many cases of mental disease, regardless of the priority of the mental disturbance or of the endocrine imbalance there is certainly a circle of abnormality established, the arcs of which are composed of both groups of factors.

2. In glandular disturbances the effects are due to a change in rate of normal function, and as thyroid extract is an accelerator principle, the stimulating action of which is intracellular, and the effect of which is not felt in any particular set of organs or tissues alone, it is reasonable to suppose that its administration in hypoglandular types accelerates the organism in general, rendering introversion more difficult and aiding the application of psychotherapy. This is well illustrated in several of our cases in which changes in behavior and improvement began simultaneously with the thyroid testing experiments.

3. For every case manifesting profound glandular disturbance there are doubtless dozens that show only little signs, and it is in these cases that a psychological or chemical attempt to break one of the arcs of the circle is more likely to result in success.

4. Both the sugar tolerance test and the thyroid function test have been found extremely valuable in differentiating and in sizing up the hypo- and hyperglandular types, in which often instead of a profound, easily recognized disturbance, only the little signs may show. It is in these that scientific application of glandular therapy has its earliest and best opportunity.

5. Occupational therapy, when applied by a therapist well trained in observing patients with mental disorders has been found of value in an experiment of this sort, not only from a therapeutic standpoint, but as an early indicator of variations in behavior. The attitude of the patient, fluctuations in interest and attention, and signs of improvement are early recognized by apt workers in this field.

6. In conclusion we wish to express our thanks to Miss Walker, the occupational therapist, and to the nurses who aided in this investigation. Our heaviest obligations are to Dudley W. Fay, Ph.D., who is responsible for the mental analyses and who is soon to publish a separate thesis on the mental constructions of these patients.

GOVERNMENT HOSPITAL FOR THE INSANE

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EPIDEMIC ENCEPHALITIS SIMULATING MYASTHENIA GRAVIS[1, 2]

Three Cases of Epidemic Encephalitis Presenting the Clinical Syndrome of Myasthenia Gravis. Preliminary Anatomical Report of Sections Obtained from the Brain in One of the Cases

By Morris Grossman, M.D.

ADJUNCT NEUROLOGIST TO THE MOUNT SINAI HOSPITAL AND THE MONTEFIORE HOME AND HOSPITAL

The following three cases are reported because they presented unusual difficulties in the differential diagnosis between epidemic encephalitis and myasthenia gravis despite the advantage of careful study and hospital observation extending over a period of many weeks. If they had not occurred during an epidemic of encephalitis, they would most likely have been diagnosticated as cases of myasthenia gravis.

Case 1. M. A., female, 53, married, housewife, born in Russia, entered the hospital January 4, 1921.

Family History.—Has no bearing on the present illness.

Past History.—She does not remember any diseases during childhood. She has been married for the past 30 years. She gave birth to six children, and had no miscarriages. She has had difficulty in hearing for the past 30 years. Twelve years ago she had a postpartum infection. Five years ago she suffered from what was said to be a right sciatica.

Present History.—Her present illness began six weeks ago with abdominal cramps and pain along the spine. For the next two days the patient noticed blood in her stool. Five weeks ago the patient began to have diplopia. There was also aggravation of a chronic headache from which she had suffered for a long time; this was now associated with tinnitus and vertigo. There was no nausea or vomiting. Four weeks ago she noticed drooping of her left eyelid; at the same time the diplopia and vertigo disappeared. Three weeks ago ptosis of the right lid occurred. She was easily fatigued and there was a general sense of weakness which incapacitated her. She can masticate her food, but is easily fatigued during the act. There has been no difficulty in swallowing nor has there been any

[1] From the Neurological Service of the Mount Sinai Hospital. New York City, New York.

[2] Presented before a clinical conference of the Neurological Staff of The Mount Sinai Hospital; January 17 and March 14, 1921.

regurgitation of fluids through the nose. For the past two weeks she has had difficulty in raising her arms and in moving her legs. This weakness is more marked on the left side. She cannot walk or stand, and is unable to raise herself from a recumbent to a sitting position. She has had frequent attacks of chilliness but no fever. There are no other complaints.

Summary of Her History.—She had difficulty in hearing for the past 30 years. Postpartum infection 12 years ago. Right sciatica 5 years ago. Abdominal cramps, pain along the spine, blood in the stools for two days; diplopia, headache, vertigo and tinnitus six weeks ago. Ptosis of the left lid four weeks ago, ptosis of the right lid three weeks ago; and weakness in the muscles of the neck, trunk, and extremities associated with marked fatigue for the past two weeks.

Physical Examination.—She is a well-developed and well-nourished woman. Her general medical examination is negative. She appears fairly intelligent, is well oriented, and cooperates in the examination. Her pupils are central, equal, regular, and react promptly to light. Although little movement takes place when she attempts to converge, her pupils respond. There is practically a complete bilateral external ophthalmoplegia. The eyelids are ptosed, the right being more marked than the left. The fundi are normal. The visual fields roughly tested do not show any contraction. There is slight atrophy of the left masseter and temporal muscles. The sensory fifth is normal. Hearing is diminished on both sides, but the patient states that that has been present for many years before the present illness. The muscles of the neck, shoulder girdles, arms, forearms, trunk, pelvis and lower extremities show marked weakness. This is more marked in the axial muscle groups. The patient is unable to hold up her head, nor can she raise herself from a recumbent to a sitting position. She can raise her arms not quite to a right angle, but is unable to hold them in that position; likewise the limbs can be raised from the bed but can not be held up for more than an instant. There is a moderate increase in the activity of all of the deep reflexes of the upper and lower extremities on both sides. The abdominal reflexes can not be elicited, probably on account of a lax abdominal wall. The plantar reflexes are active. No Babinski is present. There is no tremor or ataxia in either the upper or the lower extremities. Touch, vibratory, muscle and joint sensibility, pain and temperature senses are not disturbed. Her blood pressure was 145 systolic and 85 diastolic. The urine showed a trace of albumin and an occasional hyaline cast. The Wassermann reaction in the blood and spinal fluid is negative; 8 c.c. of spinal fluid was removed; the pressure was not increased; 8 cells, lymphocytes, were found to the cubic millimeter; the globulin content of the fluid was normal. The blood chemistry was reported by Dr. Bookman to be normal. X-ray examination of the chest on two different occasions failed to show any abnormality; no enlargement of the thymus could be detected. Electrical examination of the muscles done by Dr. Harris, on three different occasions, showed a slight

quantitative increase for the galvanic current, but no myasthenic reaction.

Clinical Course While Under Observation.—On January 7, the patient complained of difficulty in swallowing and in breathing when she would lie down. The throat was congested but the soft palate moved freely. On January 10, the right pupil was noted to be larger than the left, there was slight movement of the right eyeball to the right. All other movements of the eyeballs were absent. Ptosis of the right eyelid had increased. Weakness of the muscles of the left shoulder girdle was more marked than in those of the right. Slight atrophy of the anterior part of both deltoids was present, but there were no fibrillary tremors. The deep reflexes were all present and equally hyperactive on both sides; there was no tendency to exhaustion of the reflex at the knee after repeated stimulation. A doubtful Babinski, inconstantly present, was elicited on both sides. On January 12 the power in the muscles seemed to be slightly improved, and the patient was able to swallow with less difficulty. From this date until the time she left the hospital on the 20th of February, there was a gradual improvement in the strength of the muscles of the neck, trunk, upper and lower extremities. The neurological examination at that time showed that the patient was able to hold up her head well, and she could raise herself from a recumbent to a sitting position. She was able to walk without assistance. She can raise her arms to a right angle and keep them up for some time. The grasp in both hands is poor, and the patient has difficulty in dorsiflexion of both feet. There is a marked ptosis of both lids. The right pupil is larger than the left, both however react well to light and on attempt at convergence. The external ophthalmoplegia is almost complete on both sides. She still has slight difficulty in swallowing. All the deep reflexes are very active on both sides. One hundred consecutive taps of the tendons at both knees failed to show any diminution in the activity of the knee jerks. A doubtful Babinski and Oppenheim response is inconstantly obtained on the right side. With the exception of the external ophthalmoplegia, the muscles of the patient are gradually getting stronger.

Case 2. I. G. Male. 53. Operator, born in Russia. Entered the hospital December 23, 1920. His chief complaints were double vision, and weakness in the left arm and both legs.

Family History.—His father and mother died of causes unknown to him. One brother died of pulmonary tuberculosis at the age of 17; two brothers and five sisters are living and in good health.

Marital History.—He has two children living and well at the present time. His wife had one miscarriage.

Past History.—He does not remember having had any of the diseases of childhood. Four years ago he had an attack of "grippe," during which he had retention of urine of 36 hours. For many years he has had slight burning and frequency of urination.

Present History.—About three weeks before he entered the hospital, the patient noticed that he had double vision; the objects that

he saw were placed next to each other in the lateral plane. One week later, while walking, his knees suddenly gave way and he would have fallen but for the support received from a physician who was examining his eyes at the time. The following day the patient noticed that his left arm and hand had become weak. This weakness progressed so that he was unable to lift a two-pound package. One day later he noticed that he was unable to flex the middle finger of his left hand. About one week before admission to the hospital, the patient noticed that the upper lid of his right eye became swollen, and at the same time he was having a biting pain in the right nostril. He also noticed at this time that he swayed when walking. Four days before admission his knees gave way while going up two steps leading from the street to his house, and he fell down. The following day while standing in the kitchen he again fell and had to be helped back to bed. There was no loss of consciousness during these falling attacks. During the week before admission he had incontinence of urine on two occasions. There was no disturbance in the rectal function. The weakness of the extremities has remained stationary since the onset of his illness. For the past six months he has suffered from a dull headache in the occipital region. At times these headaches were associated with vertigo, but he never vomited. The patient states that for the past six months he has noticed that his memory was failing.

Summary of the History.—There has been double vision for 17 days. Weakness of the left arm and both legs for 10 days. Swelling of the right eyelid and pain in the right nostril for seven days. Unsteadiness in gait for seven days. Incontinence of urine on two occasions one week ago. Headache and vertigo, with failing memory for the past six months.

Physical Examination.—The patient was a well-developed and well-nourished middle-aged man. His pupils were equal, regular, and reacted promptly to light, and when he attempted to converge. The left eyeball was completely immobile due to an external ophthalmoplegia. There was moderate weakness of the right external rectus. A nystagmoid movement in the lateral plane was present in the right eyeball. There was some weakness in the other muscles of the right eye, but these were not especially tested out. Ptosis was present on both sides, the left more marked than the right. The fundi were normal. Some facial immobility was present on both sides. The other cranial nerves were intact.

The teeth were in good condition, the tongue was clean and moist. The tonsils were not enlarged but the pharynx was congested. There was no rigidity of the neck, the thyroid was not enlarged and no abnormal pulsations were felt in the neck. The chest showed poor expansion, and the lungs were emphysematous. The heart sounds were poor quality, and a soft systolic murmur was heard at the apex. The abdomen was negative.

The motor power of the upper extremities was poor, more so on the left side. The patient was scarcely able to raise his arms to

a right angle and was unable to maintain them in that position for more than an instant. The weakness was most marked in the axial groups of muscles and became less marked in the muscles of the arm, forearm, and hand; the grips however, were quite poor. Similar distribution of the muscle weakness was found to a less marked degree in the muscles of the lower extremities. When the patient attempted to stand his knees would give way suddenly and if he was not supported the patient would collapse. No atrophy or fibrillary twitchings were observed. The muscles of the trunk were also weak so that the patient was unable to raise himself from a recumbent to a sitting position without assistance.

The deep reflexes at the wrist, elbow, shoulder, ankle, and knee, were present and equally active on both sides. They were perhaps slightly more active than normal. The abdominal, cremasteric and plantar reflexes were present and normally active on both sides. There were no pathological reflexes. There was no ataxia or adiadochokinesis. Sensory examination for touch, pain, vibration, muscle and joint sensibility was normal. There was no astereognosis. Mentally the patient was alert, well oriented, and coöperated in the examination. In spite of the patient's statement, no defect in memory could be established.

Laboratory Findings.—The blood and spinal fluid Wassermann was negative. The spinal fluid was under slightly increased pressure, showed a little increase in the globulin content and no cells. The blood pressure was 120 systolic and 80 diastolic. The blood chemistry was reported by Dr. Bookman to be normal. The urine examined on several occasions showed a trace of albumin and rarely a hyaline cast. X-ray examination of the chest did not reveal any enlargement of thymus; it showed a tuberculous infiltration of both apices. Electrical examination of various muscles by Dr. Harris was reported negative on two different occasions. Examination of the labyrinth by Dr. Friesner showed caloric stimulation of the left ear to be positive in 25 seconds; in the right in 40 seconds. During the caloric stimulation there was little, if any, change in the eye movements. There was however a marked increase in the ptosis of the left lid; a phenomenon which is anatomically difficult to explain. There was no spontaneous nystagmus, vertigo, or pass-pointing. The functional tests indicated that there was a lesion in the nuclei.

Clinical Course.—On a number of occasions the patient stated that there was a marked increase in his muscle weakness at night. On January 6, at 12.30 A.M. he was examined by Dr. Krauss and me and we found that his weakness was not greater than during the day time. Complete external ophthalmoplegia was noted in the right eye on the 26th of December. January 10 slight motion in the eyeballs and improvement in the patient's general condition was noted; the next day the ptosis seemed to be less marked. On January 17 there was tendency toward the Babinski response. On January 18 for the first time since entering the hospital he had incontinence of urine. January 24 slight atrophy in the interossei

became apparent; it was thought to be due to disuse. On January 25 the patient complained of paresthesia on the right side of his face, and also that he was having difficulty in breathing. His speech was found to be nasal in character. January 27 the patient complained of difficulty in opening his mouth. His speech was decidedly nasal, but the soft palate seemed to move freely. January 31 the patient began to have difficulty in swallowing, but did not regurgitate fluids through his nose. The ptosis was slightly more marked on the left side. External ophthalmoplegia was complete on both sides. The palate moved poorly. The power in both masseter muscles was diminished. The muscle power in the shoulder girdles was somewhat improved. On February 6 the bulbar symptoms became aggravated, the respiration became labored, and the patient died the next day of typical medullary paralysis.

Autopsy of the brain was permitted. The following is a preliminary report by Dr. J. H. Globus on the pathological specimen obtained. Grossly the brain showed marked congestion. This was most pronounced in the medulla, giving the appearance of marked cyanosis. No hemorrhages or thickening of the leptomeninges were noted.

Microscopic findings in a limited number of sections proved to be of particular interest on account of the unusual features that were found. These lesions showed characteristics of a subacute inflammatory process, with acute infiltrative changes and multiple hemorrhagic foci superimposed upon them. The subacute character was recognized by thickening of the walls of the blood vessels, and through the proliferation of the adventitial elements, as well as by multiple areas of gliosis.

The acute changes were expressed by lymphocytic infiltration of the adventitial spaces, numerous small perivascular hemorrhages, and early degenerative changes in the parenchyma. These changes were most pronounced in the mesencephalon, though they were also noted in the pons and medulla.

The acute changes are strongly suggestive of the lesions found in acute epidemic encephalitis, with the difference that other lesions, subacute in nature, were added to the pathologic picture.

The results of a more detailed study of the material will be incorporated in a separate report at a later date.

Case 3. B. B. 18. Stenographer. Born in the United States. Entered the hospital March 9, 1921. Her chief complaints were increasing weakness in the upper and lower extremities; occasional attacks of diplopia, and difficulty in chewing her food and in swallowing solids. Duration: one week.

Family History.—Negative.

Past History.—Measles, diphtheria, and scarlet fever during childhood. Menstrual history is normal. No serious illness after puberty.

Present Illness.—This began four weeks ago with dimness of vision, associated with vertigo, and gradually increasing weakness in the upper and lower extremities. She has occasionally suffered

from fleeting attacks of diplopia since the onset of her illness. The vertigo lasted one week and then disappeared. The weakness in her extremities has gradually been getting more pronounced so that now the slightest exertion induces marked fatigue. For the past week the patient notices that when chewing solid food her jaws become tired very easily and that she has difficulty in swallowing solid food. Liquids are taken with less difficulty and are not regurgitated through the nose. These has been no insomnia, somnolence, or irregular involuntary movements in any of the muscles, with the exception of a tic of the orbicularis oris on the right side. Her bladder and rectal functions remain undisturbed.

Physical Examination.—The patient is moderately well nourished. There is bilateral ptosis of the eyelids, slightly more marked on the left side. The right pupil is a little larger than the left, but both react promptly and completely to light and convergence. The outward excursion of the eyeballs is somewhat limited in both lateral planes on account of a slight weakness of both external recti muscles. There is a recurrent clonic tic of the right orbicularis oris. The facial folds are flattened on both sides, the left being more pronounced than the right. The motor and sensory portions of the fifth nerve are intact. The tongue protrudes centrally, and does not show any atrophy or fibrillary tremors. The uvula is central and does not move on producing sounds, but moves normally in response to palatial stimulation. The hearing and fundi are normal. The patient is unable to raise the arms to a right angle when lifting them up at the sides, but when holding her arms forwards she is able to do so and can hold them up for a few minutes. The other muscles of the shoulder girdle also show some weakness, but the deltoids, especially the left, seem to be most affected. The biceps and the triceps also show some weakness but to a less degree than the muscles of the shoulder girdles. Only slight weakness is present in the muscles of the forearm: the grips are fairly good. There is atrophy in the posterior portion of both deltoids, and the supraspinati, but no fibrillary tremors are present. No typical myasthenic reaction of the muscles could be demonstrated, but the muscles showed a rapid fatiguability and could not be maintained long in any one position. The muscles of the trunk are also affected and the patient is unable to raise herself from a recumbent to a sitting position without aid. The pelvic muscles and those of the lower extremities showed less marked weakness than the muscles of the upper extremities, but the distribution was similar, the axial groups being more profoundly affected than the distal groups. The deep reflexes at the shoulder, elbow, wrist, knee and ankle are all present and hyperactive on both sides. There was no tendency to exhaustability on either side, after repeated stimulation of the tendons. The abdominal reflexes are present and equally active on both sides. No definite Babinski could be elicited. The Oppenheim and Gordon responses are not obtained. There is no ankle clonus. The muscle tonus is normal. There is no ataxia or tremor of either the upper or lower extremities. Occasionally a

slight choreiform twitch is present. No sensory disturbances are present.

Laboratory Findings.—The blood and spinal fluid Wassermann was negative. Ten c.c. of clear spinal fluid was removed; the pressure was not increased, and no cells were found. The globulin content was normal. Electrical reactions did not show any abnormality. No myasthenic reaction was present. The urine was normal.

Clinical Course.—On March 14, wasting of the trapezi was noted. The ptosis seems to be more marked in the evening. March 16, the patient complained of marked dysphagia and could not swallow solid food at all; even milk was swallowed with great difficulty. There was no regurgitation of fluids through the nose. The weakness of the shoulder girdle muscles is less marked. The orbicular tic occurs more frequently and choreiform movements are slightly more definite. Very slight tremor of both hands is present. The patient is emotional, but the intelligence is normal. March 18 the weakness of the shoulder girdle muscles has increased and the patient complains of great subjective fatigue. The tongue deviates to the right. The weakness in the external recti remains about the same. With these slight variations the patient's condition is about the same as when she entered the hospital.

Comment.—These cases presented clinical pictures simulating myasthenia gravis so closely that the positive diagnosis was not definitely made for some time. The apparently acute onset of the illness, the age of the patients in case one and two at the time of onset; the lack of variations in the degree of the muscular weakness; the absence of true myasthenic fatigue phenomenon; the absence of the myasthenic electrical reaction; the persistent hyperactive inexhaustible deep reflexes; and the complete persistent external ophthalmoplegia pointed against the diagnosis of myasthenia gravis. The persistent eye muscle palsies, the unequal pupils in case two, the increase in the deep reflexes in all three patients, the bladder disturbance in case two, the tendency to the Babinski phenomenon in the first two patients, the atrophy in the muscles in all three patients, the acute course of the disease in case two, and lack of remissions formed the basis for the diagnosis of acute epidemic encephalitis. The pathological findings in case two confirmed the diagnosis in one case in a group of three patients who presented remarkably similar clinical pictures.

Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY AND THE SECTION OF NEUROLOGY OF THE ACADEMY OF MEDICINE

JOINT MEETING OF NOVEMBER 1, 1921

DR. FOSTER KENNEDY, President of the Society, and DR. S. P. GOODHART, Chairman of the Section, presided jointly

FOURTH VENTRICLE TUMOR WITH SURGICAL INTERVENTION

DR. I. S. WECHSLER presented a patient of twenty-nine, seen May 25, 1921, complaining that in November, 1920, she had dizziness and spells of momentary darkness before her eyes, lasting a few seconds. Occasionally she did fall, though to no particular side. To overcome the vertigo she had to hold her head in a rigid position. The spells of dizziness used to disappear for a few weeks, then set in again. Frequently she would lose her vision suddenly for periods lasting from two to five seconds. No headache, no vomiting, no tinnitus. She had gained thirty pounds and her menses had become irregular, prolonged and profuse.

Examination showed a somewhat acromegalic face, gait, coordination, deep and superficial reflexes, sensory function, and cranial nerves normal except for inequality of pupils, LR, and bilateral choked disk of five diopters. The diagnosis of tumor of the fourth ventricle was made, tumor because of the choked disk, and fourth ventricle because of remissions, of the need of holding the head rigid to overcome the vertigo, which was interpreted as a modified Bruns symptom, and because of the absence of other localizing signs.

On admission to the Mt. Sinai Hospital the blood Wassermann and urine were negative and the blood chemistry was normal. There was eosinophilia amounting to seven per cent. The X-ray showed a normal sella and no signs of pressure. Dr. Elsberg performed a suboccipital craniotomy and found a tumor filling the fourth ventricle. It was adherent to the floor and sides and to the calamus scriptorius. An attempt to remove a piece of the tumor resulted in bleeding, which, owing to the dangerous location, necessitated a rapid retreat. The tumor appeared to be either a glioma or ependymoma.

For a short time after the operation she remained unchanged, but later developed some dysarthria, a little staggering, vomiting and slight optic atrophy. She was discharged from the hospital within a

few weeks. At no time did she have nystagmus, pyramidal tract signs, cranial nerve palsies or sensory disturbances. The patient is still living, five months after the operation. She has improved somewhat.

The interesting points considered were: (1) The diagnosis of fourth ventricle tumor during life and its verification at operation, based on a modified Bruns symptom and choked disk. (2) The absence of all signs of fourth ventricle tumor, such as pressure symptoms on the medulla, pons, cerebellum and cranial nerves. Particularly noteworthy were the absence of vomiting, headache, rigidity of the neck, polyuria or glycosuria, and vagal symptoms.

Discussion

Dr. M. Neustaedter asked what was the pulse ratio?

Dr. S. P. Goodhart said these cases are very rare and both the patient and the doctor were to be congratulated.

Dr. B. Onuf asked if a titubation were present.

Dr. Wechsler said that the pulse was always within average limits and so was the respiration; during the operation and following the operation, for a few days, of course, that does not apply. The nature of the tumor could not be determined, and an attempt to remove it, if it had been carried on, would have resulted in the bleeding to death of the patient. From the appearance of it, it was between a glioma and an ependymoma. It appeared to be a soft tumor.

A PRINCIPLE, HITHERTO UNDESCRIBED, OF THE PHYSIOLOGY OF MOVEMENT AND POSTURE. THE PRIMITIVE SPINAL INTEGRATION OF MOVEMENT IN VERTEBRATES

Dr. Walter M. Kraus said that at the present time movements are described in such terms as extension, abduction, internal rotation, etc. In other words, activity controlled by a neuromuscular mechanism is being described in terms of the muscular part of that mechanism alone. Every description of movement leaves out the neurological element of that movement. The description of its control by the spinal cord and its peripheral nerves is left out. When a complicated movement guided by integrations of the nervous system at levels higher than the spinal cord is described, a consideration of the final neuromuscular mechanism is omitted. In other words, the foundation of the control of movement by the spinal cord is left out when such words as flexion, extension, abduction, etc., are used. It would seem wise to add some terms to those describing muscular movements which would give a notion of the embryology of these muscles as well as their innervation. This, as will be pointed out, can be done very simply.

The nervous system is unquestionably built up of a series of physiological levels, of which the higher or more recent ones, phylogenetically speaking, carry out functions which are different from

the lower ones. It is his opinion that some conception of the integrating action of the lowest levels must be obtained in order to interpret the higher levels. It must be known, in other words, how the spinal cord integrates movements, in order to understand how such higher integrations as the cerebellar, act, and ultimately to understand why it has become necessary for these higher integrations to appear at all.

In order to examine this question of the existence of integration of movement of the spinal cord, it becomes necessary to consider in detail the general plan of peripheral nerves, the general plan of the innervation of muscles by them, and the embryological grouping of muscles. It was his intention throughout to present only the simplest facts in connection with these structures.

A typical thoracic spinal nerve, having nothing to do with the limbs, shows a number of divisions after it has been made up of the posterior and anterior spinal roots. The common trunk so formed divides into an anterior and a posterior division. The anterior division divides further into a lateral and an anterior branch. Furthermore, the lateral branch divides into two, a dorsal and a ventral. As far as the axial musculature is concerned, the portions of it developed from the ventro-lateral portions of the embryo are supplied by the anterior division and its branches, while the postero-musculature is supplied by the posterior branches. Thus a very simple scheme results from a physiological viewpoint, in the notion that general movements of extension are guided by the posterior division, while flexion and lateral movements are guided by the anterior division. When this is applied to the limb plexuses, two theories appear. Before stating them, it is necessary to emphasize that the limb plexuses do not include any part of the posterior division. One theory assumes that the plexuses are made up of the entire anterior division, the other that they are made up entirely of the lateral branch of this division. For the purposes of this discussion it does not seem at the moment very important to try to reach a decision as to which of these theories is correct. That theory which states that the plexus is made up solely of the lateral branch is chosen and the details of the problem are discussed in these terms.

The lateral branch divides into a dorsal and ventral branch. The primitive extremities of the embryo are flattened buds having a dorsal and ventral surface. The premuscle mass on the dorsal side gives rise to muscles, the majority of which, in the adult, have an extensor function. The premuscle mass on the ventral side of the bud correspondingly gives rise to muscles, the majority of which have a ventral function. The crux of the whole situation lies in the fact that when considering the simplest function of a muscle it is found that certain of them have a function opposite to that which would be expected from a knowledge of the side of the limb bud (ventral or dorsal) from which they develop; for example, the iliopsoas group develops from the dorsal muscle mass of the lower limb bud. However, they have a ventral function—that is, flexion.

To return now to the question of innervation, it is found that the

embryology of the muscles is beautifully emphasized by the innervation of these muscles. It is well known that the nerves of the brachial and lumbo-sacral plexuses divide into two very definite groups; one of which is posterior or dorsal and the other anterior or ventral. In the arm the ventral branches of the brachial plexuses innervate the subclavius and pectoral muscles as well as all the muscles supplied by the musculo-cutaneous and ulnar nerve. What is found when detailed table of muscles is made, based upon (1) whether they have been derived from the dorsal or ventral aspects of the limb bud, (2) whether they are supplied by dorsal or ventral branches of the limb plexuses, is that those muscles which develop from the dorsal layers of the bud are supplied by the dorsal branches of the limb plexus. The analogy to the condition in the axial musculature is obvious.

From all this one arrives at some possibility of schematization. It is found that the nerves derived from the brachial plexus are divisible topographically into two very large groups, one ventral and the other dorsal, which, in turn, supply muscle groups which are ventral and dorsal in origin (Paterson). On going further and adding, on the chart, the function of these muscles, one is struck with the fact that, as in the case of the iliopsoas mentioned before, a muscle which would be expected to have an extensor action has in reality a flexor action. In other words, were one to group the muscles activated in any given movement merely on the basis of their activity as muscles, and leave out of consideration the origin of their embryology and activating nerves, one would be leaving out entirely the division of these nerves and of their end organs, the muscles, into a large ventral and dorsal group.

To illustrate how this information may be used for the purpose of discovering just how the spinal cord may integrate movement, let us take the process of stepping. If the extreme forward movements of the leg be represented, it will be seen at once that the forward movement is carried out by the iliopsoas, quadriceps and tibialis anticus muscles. Though this forward movement of the leg as a whole is spoken of as flexion, it is quite obvious that it is of dorsal origin, since all the muscles which carry it out are of dorsal origin. On the other hand, the carrying backward of the leg is brought about by the hamstrings, gastrocnemius and soleus group, and the tibialis posticus, all muscles having a ventral innervation and being of ventral embryological origin. Consequently the movement of extension of the leg as a whole at the hip is, in reality, ventral in origin. To go further and take the associated movements of the arms and legs, when the left arm is forward and flexed, the left leg is extended at the hip, flexed at the knee and extended at the ankle. It is generally stated that the arm and leg on the same side are acting oppositely, in that the arm is flexed while the leg is extended, and the arm is, for example, forward while the leg is backward. If this be interpreted in terms of the neuromuscular mechanism controlling it, rather than in terms indicating the geometrical relations, such as flexion, extension, etc., it is found that the arm and leg on the same side are both directed, in this particular example, by ventrally innervated muscles,

so that the notion that the arm and leg go in opposite directions on the same side must be reversed when the neuromuscular mechanism is considered as the basis of movement.

It is proposed that to the words now used to indicate the activity of a muscle, such as flexion, abduction, extension, etc., two words be added, namely, ventrad and dorsad, which would serve to indicate three things:

1. The embryological origin of the muscle.
2. The nerve supply of the muscle (ventral or dorsal branches).
3. The primitive direction in which the limb was carried by that muscle.

By adding these terms we describe movement in terms of the neuromuscular mechanism, instead of leaving out the activity of the nervous system entirely.

Furthermore, the primitive integration of movements of the spinal cord is seen to be one which throws into activity the muscles which develop together and are innervated together. This very simple movement of a group of such muscles must be brought about by a correlation mechanism within the spinal cord, and forms the foundation of movement. So simple a movement as could be brought about by the simple activation of large groups of what were primitively ventral or dorsal muscles was obviously insufficient for the needs of animals. Further and different integrations of movement became necessary, and so not only the spinal cord, but the more recently developed portions of the nervous system, came into existence, in order to make possible these new and more complicated patterns of associated movement. An example of one of these within the spinal cord itself is the flexion reflex, "flexion of the three great joints." This term gives the impression of a certain homogeneousness of action which, when interpreted in terms of the neuromuscular mechanism, is found to be entirely absent, in that flexion of the hip is a dorsad movement carried out by the iliopsoas group, flexion of the knee is a ventrad movement carried out, in this instance, by the hamstrings, and flexion of the ankle is a dorsad movement carried out by the tibialis anticus.

Note: The paper as originally presented was but a bare outline of the matter which should have been presented. An abstract of such a paper must of necessity leave a great many points of the greatest importance untouched and must leave undiscussed many of the points presented.

Discussion

Dr. S. E. Jelliffe said that he wished he knew enough to discuss intelligently the paper that Dr. Kraus had given. His modesty, he said, forbade him to enter into a criticism, because he felt certain that Dr. Kraus has emphasized a method, a new method of analysis of motion. Whereas for himself the embryological evidence always lags behind the phylogenetic argument, he should like very much to have Dr. Kraus, in his further expositions of the situation, link up

the phylogeny of these movements and show wherein they conform to the present embryological schemes. Then he thought that a certain number of the difficulties that Dr. Kraus himself had suggested would perhaps be clarified.

He said the paper had provided a stimulus whereby further observation of muscular activities will take on an entirely new aspect.

Dr. Kraus said, in reply to Dr. Jelliffe's remarks, he thought that the phylogeny of the matter is the only ultimate way to decide it.

The reason for bringing these little animals down was to emphasize that point. He did not think, however, that it was necessary to give the "why" of these things to emphasize the facts. The facts remain. What he tried to emphasize throughout was that what he was dealing with were facts, not theories. We must, I believe, speak in terms of the neuromuscular mechanism and not of muscular mechanism only.

Dr. Stookey's emphasis of the many functions of a single muscle is extremely pertinent. We must take a primary function first and then try to explain, if we can (and in many instances we can), why a muscle assumes a secondary function. Take, for example, the activity of the flexors of the wrist. There the prime action is flexion; but they have also assumed an action of adduction or abduction. We must, as you see, examine these movements carefully before reaching conclusions.

Now, as to the use of the abductor of the little finger, or let us take the abductor of the thumb—that certainly is abduction; it is from the middle line, the axis of the extremity. But as I am speaking of terminology, I should like to emphasize that when we speak of it as abduction, we think of it in the same way as we think of abduction of the arm, though the innervation and embryology indicate that one is dorsad, while the other is ventrad. If we use the terms ventrad and dorsad, we know how different is the innervation in these two cases. I do insist (and I will make this the only point I would like to insist entirely upon) that we must use the neuromuscular mechanism as a basis for the interpretation of movement and not the muscular only. If we are going to interpret the activity of higher levels, we must interpret that through the nervous system. We must not pass from the action of the cortex to flexion, for example, without knowing in the least how the spinal cord has come into that integrating action.

SOME THERAPEUTIC EXPERIENCES OF MYASTHENIA GRAVIS

Dr. Charles L. Dana stated that the prognosis of this disease as generally given was very bad; according to Oppenheim, 26 out of 38 cases died; Dr. Hun found that most cases die in from one to three years; Dr. M. Allen Starr found that about 45 per cent. of the cases collected by him died within six months. Dr. Dana stated that his experience had been quite different, and he felt he ought to record it. He had had under observation 14 cases in the last 20 years; he had not been able to follow up the histories of all of them, and some

had died from natural causes; but, in general, he could say that none of them had died of the disease while under his observation, and he had had them under observation for from one to seventeen years.

TABLE SHOWING DURATION OF DISEASE WHILE UNDER OBSERVATION

1 year, 5; 2 years, 1; 4 years, 1; 5 years, 1; 6 years, 1; 7 years, 1; 12 years, 1; 13 years, 1; 17 years, 1.

TABLE OF RESULTS

Recovered	4
Practically well	3
Improved	4
Not improved	1
Died of cancer	1
Not followed up	1
	14

Dr. Dana thought that the better prognosis of the cases was due in part at least to the treatment which he had employed. This consisted of massive doses of strychnine combined with rest and elimination. The doses reached in some cases one third grain given hypodermically two or three times a day.

The speaker also referred to the frequency of prodromal attacks; in 50 per cent. of his cases the serious attacks were preceded by short attacks lasting only a few weeks and characterized by some ocular symptoms and bulbar weakness. In some cases these prodromal attacks were not followed by any other attack for many years; in one case as long as seventeen years elapsed. Dr. Dana called attention to this fact and thought it quite probable that mild abortive attacks of myasthenia gravis characterized by diplopia and slight exhaustion of the bulbar centers were not infrequent. In some cases the prodromal seizure was simply an ocular one, and one of the causes of casual ocular palsies of permanent type was undoubtedly myasthenia gravis. This fact was not recognized in the systematic works on ophthalmology. Dr. Dana referred to myotonia as an occasional complicating symptom of myasthenia. He thought the disease toxic and endogenous and one that affected both motor neuron and muscle. He had seen no result of note in endocrine therapy.

DISCUSSION

DR. BERNARD SACHS said that Dr. Dana's contribution to this subject is of great interest, and he was willing to endorse his rational therapy. There is nothing surprising in the fact that he has employed strychnine. In the cases that he had had at the hospital during the past ten years the uniform treatment, particularly for the bulbar symptoms, has been the use of strychnine, but of course they have not employed it in any such doses as Dr. Dana now recommends, and he should be very glad, when the opportunity presents itself, to put that high dosage to a further trial. His experience has been an extremely fortunate one. He confessed that of all the cases in which he had made the diagnosis of myasthenia gravis pseudoparalytica only very few recovered or remained alive long enough for him to record a temporary recovery.

He wondered, though, if Dr. Dana hasn't experienced very much the same thing that he had experienced in the course of these years: First of all, that the disease that some of us call myasthenia gravis pseudoparalytica includes a number of rather discordant types of disease, and he thought, particularly in view of the experience that we have had during the past few years with various forms of encephalitis, not only the encephalitis lethargica, he wondered whether, in view of that experience, we should not all be inclined to think that some of the cases that we labeled as myasthenia gravis were really some form of encephalitis. There are no doubt other forms of infectious encephalitis besides encephalitis lethargica, and personally he was inclined to think that some of these cases that have been covered may have been cases of that type and not cases of myasthenia gravis.

He was referring to this fact more particularly because of an experience which they have been undergoing for the last two or three years at the hospital. His associates and himself have been very deeply interested in all forms of bulbar palsies and we have seen a rather curious number of extremely complicated and difficult bulbar cases. Some of them they were inclined to regard as myasthenia gravis, and in other cases again they really were not able to label the cases in that way. One or two of the cases recovered; others died, and the entire subject still remains more or less of a mystery to him, except that he has no doubt that there are cases that are due to severe toxic products circulating in the body. It would be only a short jump from that to the supposition that some of the cases were due to infections of all sorts in the body, and he believes that a further study would probably prove to us that many of these cases are really distinct forms of encephalitis. The actual proof of that, as you can easily recognize, would be a rather difficult one to secure.

He would, however, like to know whether Dr. Dana himself would be rather inclined, in view of our recent experiences, to accept that view in regard to the interpretation of some of the cases that we labeled as myasthenia gravis. If he were simply to state a general impression as to the number of cases he would be willing to call myasthenia gravis, he would say that he had not seen more than six or ten of them in so many years. So that the subject is one, he thought, that is well worth considering in every way.

He would like to have Dr. Dana state whether the symptoms actually cleared up rather promptly on the administration of the large doses of strychnine; for instance, whether the ptosis disappeared and whether the tongue symptoms cleared up, whether there was a prompt recovery or not, on the exhibition of the strychnia. It seemed to him to be a rational method of procedure and he should be only too glad to adopt Dr. Dana's suggestion and benefit by his experience.

Dr. L. P. Clark said that a number of years ago at the National Hospital for Paralytics and Epileptics, Sir William Gowers was very keen on the use of strychnine in his myasthenia gravis cases. He was particularly impressed with the enormous advantage that he gained from such administration. Later he had the opportunity of noting cases in the service of Dr. Starr at Vanderbilt Clinic. He

saw advantages in the foreign cases, but did not recall advantages obtained on this side with either small or large doses. He continued to use strychnine for a period of two or three years, beginning with small doses and running up to a fourth of a grain.

He said he would like to ask Dr. Dana, who has had a very considerable personal experience, how he explains the rational therapeutics of the strychnine, if this is some form of glandular disturbance (which now seems more than likely); how does the strychnine operate against an organic conductivity of the systemic values?

He had been very much surprised to note the enormous suggestibility that these cases have and the neurotic attitude they take toward the disease. Several months ago he was asked to see a case, not because of the myasthenia gravis, but because there was possibly a neurosis superadded. The diagnosis seemed quite correct and everything had been done for the patient that was possible. He suggested that he get a change of environment by taking a rest in the country. He was very much surprised the other day when this man's wife came to see him and reported that he was walking two miles, was engaging in all sorts of activities, and everything but his speech (which was predominantly bulbar in type) was enormously improved. Simple advices had evidently impressed the patient and had much more to do with his betterment than any special therapy that had been undertaken.

Why would it not be a good idea to try the glands on other cases, if, as the doctors say, the disease is the fault of some gland? He was particularly impressed after he saw this patient that he was going through a rather definite, almost a psychotic delirium of his disease, and he was surprised to see the type of mental reactions he was taking through this organic detail. There are certainly enough cases on record for us to work toward eliminating that particular issue and also take up some of those that Dr. Sachs has suggested, of other types of infections.

He should like to end by asking Dr. Dana upon what rationale is the strychnine acting. Is it against the functioning of a certain unknown gland?

Dr. Jelliffe said that while listening to Dr. Dana's paper his thoughts had run along the lines that Dr. Sachs had so well emphasized. That whereas one can predicate type of reaction focused about what is termed myasthenia gravis, shading off from such a picture a great number of semi, demi types are observable, some of which undoubtedly belong in with the groups which Dr. Sachs has emphasized; also others that heretofore have been called periodic palsies, and a whole group of phenomena related to irregular muscular reactions due to acute or chronic conditions chiefly in the medullary nuclei. It seemed to him that that is a useful way of looking at the whole situation. Of course, if, with a certain trend of mind, one is apt to lump all these things together and speak of a disease sui generis, then he thought Dr. Dana's attitude of mind quite justified. However, if one is inclined to see so-called pure types and divergent types and a whole group of situations which clinically may

be grouped about a very definite syndromy, it seemed to him the results which had been reported were quite comprehensible.

Dr. Dana has spoken of the endocrine situation. It seemed to him that Dr. Dana sketched too broad and glaring a type of generalization. He felt disposed to think that if the particular group of glandular involvements had a certain specific action, either on one or the other branches of the vegetative nervous system, then one could commence to predicate an endocrine disorder. That is to say, one might say, "Here is a disturbance in a muscular mechanism which is doubly innervated." The sympathetic arc of the vegetative mechanism, it seemed to him, is the one that is most primarily involved in the pure types of myasthenia gravis. If that be so, there is a very good rationale why strychnine should be of value in that type, because it is, of all of the plant alkaloids, the most powerful stimulant to the sympathetic branch of the vegetative nervous system. That is also a reason why calcium is therapeutically of value, and why sometimes the myasthenia gravis cases appear very closely related to parathyroid disturbance.

Dr. B. Rosenbluth said the subject of myasthenia gravis interested him greatly. In studying the literature, he had come across a similar disease occurring in Switzerland and also in Japan, which offered all the symptomatology of myasthenia gravis. This disease occurs in the most crowded quarters and among the poorest class of people who are undernourished. For example, in Japan it is found among the laborers in the rice fields, and it is found among people usually who are terribly underfed and undernourished. He had had only four cases, and instead of using any medication, he had put the patient to bed and kept on feeding him by means of the duodenal tube. Dr. Larkin cultured one case and was unable to discover anything definite; and he had a similar experience and negative results in another case. The two cases of myasthenia gravis which recovered might have been an erratic type of this form of disease. It is very possible that with more refined bacteriological technique one might recover and be able to correlate this disease with its occurrence in the different parts of the earth. That being the case, we can see the reason that any form of treatment that is kept up long enough, with stimulation and nourishment, will bring the patient over the bad part of it for two or three years. These cases take a very long time.

Dr. Dana asked if this disease kept on recurring every year.

Dr. Rosenbluth said it recurs every two, three or four years.

Dr. Charles E. Atwood said he wished to call attention merely to one fact in relation to this disease. Of course, we have all seen a number of cases and we realize that they are subject to remissions, and that the disease renews itself frequently by fatigue. Possibly the explanation of the renewal of the symptoms is from the suboxidation which takes place in fatigue. He has a case of myasthenia now that has lasted since 1907. The case has done the best with hygienic symptomatic treatment and small doses of strychnine. The myasthenic reaction is one of the most reliable tests, perhaps, in differentiating myasthenia gravis from other diseases.

Dr. Foster Kennedy said his experience in this matter has been

that there is rather a difference of prognosis in the subjects who are young; *i.e.*, in the subjects who are under forty and in the subjects who are over forty, it being decidedly worse in those who are in their twenties. The disease, as he has seen it, has run a very much shorter course in the young than in the middle aged or aged.

He mentioned to Dr. Dana that he had been fortunate enough to see a series of autopsies on myasthenia gravis, with the extraordinary chance that in five of them an enormously enlarged thymus existed. This thymus was not so very great as regards glandular bulk, but it was great as regards glandular expansion. The thymus existed as an object perhaps two thirds the size of my hand, stretching down over the pericardium—a very extraordinary phenomenon, one which certainly can not be without significance in the disease, though its exact correlation with the symptoms I am not able to state.

Dr. Charles L. Dana said he was much obliged to the gentlemen who have joined with so much interest in a discussion of this subject. It certainly is a very interesting one and one which seems to him to deserve further and closer scrutiny. With regard to the point that Dr. Sachs made, Dr. Dana had written this—he didn't read it: "Myasthenia Gravis is a disease which runs peculiarly true to type," etc. Therefore, he thinks that Dr. Sachs's suggestion that we ought to scrutinize these cases with especial care is a very wise one. He thinks that one case he had in mind was perhaps not true myasthenia gravis, though he thought it was at the time. You must not think that you have to give massive doses of strychnine always or all the time. He finds sometimes that a fifteenth of a grain is enough, and sometimes even a little less; but it seems to him that the most permanent and satisfactory results were those in which these larger doses were given for a considerable time.

With regard to the frequency of the time or the effect of the disease, the symptoms do not clear up right away. You will have to use the injections for perhaps three or four weeks before they begin to show, and it seems to Dr. Dana, from his experience, that there is nothing psychical in the patients. The patients he had seen were treated seriously, of course; when he saw them, they were put to bed a large part of the time; they were kept very still; they were given these very large doses and they knew they were being actually treated. There wasn't any suggestion about it, nor were there any psychic elements in the case.

He doesn't quite understand Dr. Jelliffe's remarks. It seems to him the disease is a poison of the somatic rather than of the sympathetic part of the system.

Dr. Jelliffe replied that the somatic muscles have a double innervation, sensori-motor and vegetative, and that involvement of the sympathetic was a better hypothesis, he believed.

Dr. Dana said that he thought it was sensori-motor innervation that is affected.

In regard to the point made by Dr. Kennedy, I can only say that one of my cases, one of the very best ones, a boy of nineteen, has now been well for six years; but all the other cases were in the thirties or forties—perhaps more of them beyond forty than under it.

Current Literature

II. SENSORI-MOTOR NEUROLOGY

4. MIDBRAIN; CEREBELLUM.

Pol, D. J. Hulshoff. Experimental Cerebellar-atactic Phenomena in Extra-cerebellar Affections. [Koninkl. Akad. v. Wetenschappen te Amsterdam, 1919, XXI, 1095 (3 figs.).]

Pol has shown that our equilibrium organ is not exclusively located in the vestibular organ, but has its arborizations throughout the whole body, the vestibular apparatus forming but a part of it. The equilibrium tracts, which run centripetally as the tracts of Flechsig and of Gowers, possess exactly the same function as the fibers of the vestibular apparatus; sensory cerebellar ataxia, then, should occur when these two tracts are damaged in their course through the cerebellum. Pol therefore attempted to interrupt experimentally these tracts before they reach the restiform body, and also to injure more or less the vestibular nerve before it arrives within the dura. The operation was done in two stages on cats and dogs. In the first the spino-cerebellar and the funicular posterior tracts were transsected; when the operation was done above C_1 all the cats died, so it was done between C_2 and C_3. The pyramidal tract was slightly damaged by the operation. In about a fortnight the ataxy had passed off and the second operation was then performed. The labyrinth and the vestibular nerve were destroyed; five cases were successful. Pol concludes that by transsecting the tracts of Goll, Burdach, Flechsig and Gowers and the fibers of the vestibular organ it is possible to provoke cerebellar ataxia; and that these experimental results confirm his previous clinical findings that sensory cerebellar ataxia occurs through interruption in the cerebellum of these four afferent tracts. [Leonard J. Kidd, London, England.]

Pol, D. J. Hulshoff. Cerebellar Functions in Relation with their Localization. [Psychiatrische en Neurologische Bladen, 1915, No. 3 (4 figs.).]

From his experiments on dogs and from a critical review of the literature Pol concludes that the mammalian cerebellum performs many functions. It exercises a static, sthenic and taxic influence on the muscles; loss of this function gives Luciani's secondary ataxia; this function appears to be uniformly spread over the whole cerebellar surface (Luciani, van Rijnberk, Hulshoff Pol). The cerebellum also influences the degree of muscular movement; loss of this function gives dysmetria of movements; this function is localized in Bolk's centers, especially, according to Pol, in Bolk's lobulus paramedianus; lesion of this lobe gives

in dogs the "parade step" (goose step). Thirdly, the cerebellum directly governs the coordination of muscular movements (Hulshoff Pol); loss of this function gives primary incoordination; this function is localized in Bolk's sublobulus C of the lobulus medianus posterior, and this center subserves coordination of movements in the hind limbs. Finally, the cerebellum has a direct influence on the condition of the equilibrium of the body; this function is localized in the fibers of the nervus octavus which end in the cerebellar roof nuclei (Winkler, Ewald). According to Pol, the ataxic signs of Luciani are produced by lesion of Bolk's lobulus medianus posterior, lobulus paramedianus, and crus 2 of the lobulus ansiformis. In addition, a lesion of crus 2 of the ansiform lobule gives dysmetria of movements, shown in dogs by the "cock's stride." [Leonard J. Kidd, London, England.]

Stenvers, H. W. THE DIAGNOSIS OF PONTILE ANGLE TUMORS. [Nederlandsch Tijdschr. voor Geneeskunde, 1920, LXIV, November 6, 1871.]

The diagnosis of pontile angle tumors may be very difficult; in five out of six cases a wrong diagnosis was made by neurologists and by otologists. Stenvers narrates a case which was described in 1916 as one of unilateral reflex anesthesia of the trigeminus nerve, and in 1919 as disseminated sclerosis; the latter diagnosis was based largely on the absence of appearance of illness, the ability to do his daily work, absence of attacks of loss of consciousness and of vomiting, slowness of pulse, headache and of vertigo. Stenvers shows that all these symptoms may be absent in pontile angle tumors; in his experience the pulse frequency in these cases has been either normal or greatly raised. The patient mentioned above was a man of 26, examined by Stenvers in March, 1919. In 1915 he had tingling and attacks of neuralgic pain in his left trigeminus nerve, followed by gradual right deafness and vertigo. He had remission of symptoms from time to time and this fact helped to suggest disseminated sclerosis. In March, 1919, he had limitation of visual fields, some degree of bilateral optic neuritis, large reacting pupils, both corneal reflexes diminished, especially the right. Right deafness with left trigeminus paresthesia and neuralgia, left facial paresis and to a lesser extent right also, nystagmus to both sides, ataxic gait with deviation now to right and then at times to left. When standing with eyes shut he falls backwards, to left especially; asynergia is seen in failure of knee flexion as he falls. Echinococcus reaction in blood +2. Negative von Pirquet and also Wassermann in blood. A bitemporal x ray photo showed a secondarily greatly dilated sella. The vestibular reactions were normal. Stenvers cites cases of right pontile angle tumors with left trigeminus neuralgia. An x ray photo in his case showed erosion of the medial part of the right petrous bone, the left being normal. This objective fact proved the existence of a right pontile angle tumor. Operation removed a tumor of considerable size; death two days later, with bulbar symptoms. This case illustrates the

vital importance of an x ray photo of the petrous bones. In all the cases of pontile angle tumors, verified by necropsy, seen by Stenvers, erosion of the petrous bone has been found. And in all the ten cases clinically examined by him an x ray plate of the petrous bones has been diagnostically successful. He relates also a case of a peripheral lesion which simulated a pontile angle tumor: On necropsy a carcinoma of the gall bladder was found; a metastatic extracranial growth gave severe trigeminal neuralgia, etc., and had proliferated through the middle cranial fossa (figured). There was no trace of any pontile angle tumor. The moral of Stenvers' paper is that in the diagnosis of these pontile angle tumors an x ray photo of both petrous bones is essential, for by ordinary clinical tests these tumors are often not correctly diagnosed. [Leonard J. Kidd, London, England.]

Stenvers, H. W. Clinical Study of Cerebellar Function and the Diagnosis of Cerebello-pontile Angle Tumors. [Drukkerij "Davo," Deventer, June, 1920, pp. 150 (10 figs.).]

In this Utrecht University thesis Stenvers gives an excellent clinical study of the cerebellum and of ponto-cerebellar angle tumors, and discusses the nature of the function of the human cerebellum. Chapter 1 contains a review of the chief opinions held on cerebellar functions. In chapter 2 cases of pontile angle tumors are detailed. Chapter 3 contains clinical observations on some cerebellar symptoms. And chapter 4 gives Stenvers' views, based on his own clinical observations. His conclusions are as follows:

1. The diagnosis of pontile angle tumors is often clinically very difficult.

2. In all cases of these tumors seen by him a röntgenographic study of the petrous bones has proved of great diagnostic value.

3. For a good differential diagnosis the posterior cranial fossa needs photos of the petrous bones by Stenvers' method; the method of Henschen-Quix is insufficient for this purpose (an illustrative case is given).

4. In pontile angle tumors there may be most variable and changeable conditions of the facialis innervation.

5. The presence of intact vestibular reactions does not exclude the possibility of a pontile angle tumor.

6. Auditory neuritis (stauung-neuritis) does not cause great deafness. Its presence on one or both sides, without any peripheral aural affection, indicates a local lesion of the cochlear root or nuclei.

7. The majority of the tumors hitherto described as ascusticus tumors do not deserve that name; they are better called pontile angle tumors.

8. Pontile angle tumors grow towards the occipital foramen, the place of least resistance.

9. Nystagmus is not a cerebellar sign.

10. Diadococinesia (quick pronation and supination) is intimately related to a good functioning of the homolateral cerebellar hemisphere, while the vermis has no share in that function.

11. The pointing errors of Bárány are of great value in the diagnosis of cerebellar diseases, but their use needs caution.

12. In the disturbances of gait in cerebellar affections there is no definite rule as to the direction in which the patient falls.

13. In cerebellar lesions involving the middle peduncle the patient mostly falls to the side of the lesion.

14. Cerebellar speech disturbances can occur in cases of unilateral cerebellar hemisphere of the side on which the arm is mostly used, *e.g.*, lesion of right cerebellar hemisphere in right-handed persons and vice versa. (This subject has been greatly neglected by most writers.)

15. The pointing test of Bárány depends on a reflex mechanism which is brought about by both cerebrum and cerebellum.

16. The pointing errors produced by Stenvers' prism tests are analogous to Bárány's vesetibular stimulation methods. (Illustrative cases are here detailed. This method needs, however, a degree of visual acuteness which is often absent in cases of pontile angle tumors.)

17. The gait disturbances described by Bruns in some cases of frontal lobe lesions are not truly comparable to those of cerebellar affections. (Stenvers describes a personal case.)

18. The cerebellum is not a coordination center, but is to be regarded as a reflex organ that unconsciously regulates and influences our voluntary movements that are coordinated elsewhere in the central nervous system. [Leonard J. Kidd, London, England.]

Atkinson, E. D., and Drought, C. W. Two Cases of Early Paralysis Agitans. [Lancet, July 10, 1920.]

Without careful analysis these two cases are reported as of paralysis agitans, in soldiers, both under the age of 30 years. Whether due to midbrain hemorrhages from shock, epidemic encephalis or syphilitic encephalitis of midbrain localization is not analyzed.

Porru, C. Arsenic in Paralysis Agitans. [Policlinico, September 6, 1920.]

The old arsenical therapy of paralysis agitans has reappeared. Large doses of sodium cacodylate are being used. Slight if any benefit was the rule and it was transient in all but one case.

Schippers, J. C. Tremors in Children. [Nederland. Tijdschr. voor Geneeskunde, 1920, LXIV, September 11, 983.]

According to Peritz, tremors occur relatively seldom in children. Pelnar distinguishes tremor from athetotic and choreiform movements and defines it as consisting of small involuntary movements oscillating round a position of equilibrium; it is fairly regular, and is localized in a joint or a group of cooperating joints; it causes no fatigue and does not interfere with movements. As to its nature, he thinks that in the static innervation of skeletal muscles we have to do with an oscillating

and undulating tetanus; the oscillations have a frequency of fifty per second, the undulations one of eight to thirteen waves; only the latter can be registered by a sensitive apparatus; they are really the true tremors; in static innervation they have the oscillating intensity of a continuous tetanus. Kollarits regards tremor as a sequel of a disturbance of coordination of agonistic and antagonistic muscles; since even during rest a certain activity of muscle takes place, there is thus no particular difference between trembling during rest and in movement; the cause of the tremor must be looked for in the cerebral cortex. Pelnar gives the chief kinds of tremor thus: Physiological tremor in healthy persons, emotional tremor, adynamic tremor, tremor from cold or trauma, tremor from poisons, as alcohol, nicotine, ergotine, mercury, the thyroid gland, etc., uremic and eclamptic tremor, neurotic tremor, tremor in Basedow's and in Parkinson's disease, in organic nervous diseases, hereditary and familial tremor, and tremor from commotio.

Schippers here records five cases of various kinds of tremor in children: (1) hereditary familial tremor in a boy of eight; fine, quick tremor in arms; genitalia large for his age, but no sexual precocity; the family history showed the true nature of the tremor; (2) two cases of acute cerebral tremor in infants under two years of age; this kind of tremor is sometimes of unilateral distribution, sometimes limited to arms or legs; there may be lively reflexes, spastic signs, pareses, ataxia; once facial paresis and nystagmus; the tremor usually follows an acute infection, as pneumonia, measles or intestinal catarrh; it lasts for from two to twelve weeks and is usually of good prognosis; (4) a sporadic case of cerebrospinal meningitis of a two months' infant, with tremor, and (5) an infant of twelve months in whom tremor of arms on emotion was present; lumbar puncture showed a meningitis. Necropsy showed a ventricular meningitis and great hydrocephalus. Tremor as an early sign of meningitis is seldom seen, but Hutinel regards prodromal tremor as a diagnostic sign of meningitis in children. Schippers concludes from his observations that tremors in children, when nonsymptomatic, are of the greatest importance; their presence should lead us to a careful search for other signs of central nervous system affection, and eventually to lumbar puncture. [Leonard J. Kidd, London, England.]

Winkler, C. Anatomical Changes in the Brain of a Cerebellectomized Dog. [Nederland. Tijdschr. voor Geneeskunde, 1920, LXIV, September 4, 958.]

Winkler describes to the Amsterdam Neurological Society the anatomical changes in the brain of a dog cerebellectomized five months previously by Dusser de Barenne. The knife had passed between the flocculus and the brain stem without damaging the tuberculum acusticum or the nucleus ventralis VIII. Certain complications of this successful operation were produced, viz., an extensive hydrorhachis of C_4 and slight degeneration in both pyramidal fields; certain motor disturbances

had been present during life, probably dependent on these. In the spinal cord much of the marginal zone of the lateral column had gone. There was some loss of fibers in the dorsal spinocerebellar tract, and no cells were found in Clarke's columns. There was much cell loss in the pars intermedia medulla, possibly dependent on the disappearance of the ventral spinocerebellar tract. In the bulb there is no loss of the large cells of the nuclei of von Monakow, Goll or Burdach, nor in the lemniscus medialis. But a large number of the medium sized cells have fallen out, and this goes with a poverty of the internal pons fibers. Winkler thinks that the medium sized cells of the dorsal column nuclei (except von Monakow's nucleus) are connected with the cerebellum by internal pons fibers via the restiform body. The restiform body contained no normal fibers. The large cells of the dorsal column nuclei are a little smaller than normally occurs. Roughly speaking all the cells of the lateral columns and the group of uppermost olivary nuclei are gone, and no external arcuate fibers are seen; for both lateral column nuclei this holds good for the ventral part; there a great part of the aberrant lateral column bundle is absent and the nucleus here reaches the surface; trabecula are found there without cells. But in the more dorsal parts of the lateral column nucleus fine large cells are seen. Accordingly, Winkler thinks the lateral column nucleus may be divided into a distoventral part which sends its fibers to the cerebellum through external pontile bundles, and a dorsoproximal part that does not. At the distal end of the group of the lower olivary nuclei the nuclei are lost on both sides and there is but little of the gelatinous material in which they lie. In the lateral bend, which the left lateral column band makes, one finds about its middle and in the more proximal parts a group of cells crowded together, while both parts of this nucleus contains preserved cells (a small part of the right of the cerebellum has been left behind at the operation). The adhering roots of the nervus octavus showed no changes. On both sides the radiations of the cochlear and the vestibular nerves and the descending root of the nervus octavus are normal. Thus, Winkler cannot admit that octavus root fibers end directly in the cerebellum or its intrinsic nuclei. Both tubercle acustica are normal. The ventrodistal end of the ventral nucleus of the nervus octavus contains normal cells; the cell masses between the fibers of origin of the cochlear nerve are normal; on both sides the corpus trapezoides is powerful and the trapezoid nuclei and those of the uppermost olivary nucleus group are normal; so also are the lateral fillet and its ventral and dorsal nuclei and the posterior corpus quadrigeminum. But the dorsoproximal part of the ventral octavus nucleus is importantly altered, especially on the left; its medium sized cells have gone and in the proximal end of the nucleus there is a sharply divided line between its normal and its affected parts. Winkler concludes that a bundle passes from the dorsoproximal part of the ventral VIII nucleus along the pedunculus flocculi to the

cerebellum. Notwithstanding the splendid radiation formed by the vestibular roots in the nucleus triangularis VIII, this nucleus is very small, owing to the falling out of large cells, the right and the left nuclei being equally diminished. At the same time the longitudinal fibers in the corpus justirestiforme (I. A. K. of von Monakow) are diminished, with the exception of descending vestibular roots therefrom. The great loss of large cells which lie in groups in the nucleus triangularis shows that the medial and lateral perforating fibers in the juxtarestiforme body arises therefrom, and that thus the nucleus triangularis VII forms powerful connections with the cerebellar nuclei. The large cells of Deiters' nucleus and also the vestibulospinal and the vestibulomesencephalic tracts are normal. The pons shows greater changes than the bulb; its breadth is not one third of normal; the left peduncle contains no uninjured fibers; on the right, a very small part of the peduncle remains connected with the wrinkled piece of the lobulus ausatus (left behind by operation). The ventral nuclei of the pons (Winkler uses for this complicated gray matter the nomenclature of Besta, Masuda and Brouwer): (*a*) the medial nucleus; on both sides there is loss of all its cells and a rich secondary glia proliferation; (*b*) the intra- and peri-peduncular wicker work; although the trabeculae are left there are no cells therein; (*c*) dorsal, dorsolateral nuclei; on both sides all cells have disappeared; (*d*) lateral nucleus; all cells gone on both sides; (*e*) the left ventral nucleus has no cells in its distal end but soon we find normal cells in it (coming from the opposite cerebellar remnant). Both its small superficial and large, more deeply situated cells are diminished in number but are to be called normal in so far as they are preserved; these cells are found running laterally of the uninjured pes pedunculi through the pons and are seen even in the most proximal sections. The right ventral nucleus has lost almost all its cells, but in its middle part a very small group of intact cells is seen. To sum up: There is complete cell loss in all the nuclei of the ventral pons formation, with the exception of the ventral nucleus; the nucleus on the side opposite to the cerebellar remnant contains a very large number of normal cells, while that on the homolateral side has but few normal cells. Evidently this cell preservation is connected with the presence of the remnant of the lobulus ansatus left by the operation. But the very severe and extensive cell loss in this ventral pons formation justifies the opinion that the cells of this gray mass send their fibers exclusively to the cerebellum. The ventral nucleus sends its axons to the contralateral lobulus ansatus, but only a few axons go to the latter from the homolateral ventral nucleus. Winkler has compared his preparations with carmine preparations made from a hemicerebellectomized rabbit, and is convinced that unilateral destruction of the cerebellum does not lend itself to a judgment on the question; on the contrary nothing is so apt to confuse the judgment over the ventral pons nuclei as a study of unilateral or partial cerebellar

lesions, even when comparison with the normal is possible. For, as appeared in his own dog, the crossed ventral nucleus especially had lost many cells, but in all the other nuclei the cell loss was bilateral. Thus, he accepts the old opinion that the cells in the ventral pons formation belong to the cerebellum. Finally, in the brain stalk the brachia conjunctiva, the uncinate bundle and the ventral spinocerebellar tract are gone. No intact fibers were found. The superior cerebellar peduncular decussation is reduced to a field filled up by glia proliferation. The field of the red nucleus is very small; the fibers around and in it are gone. The gray wicker work, in which the large polygonal cells of the red nucleus are enclosed is almost entirely missing, but these large cells are preserved. Winkler says that the most important part of this research is that all the cells of the ventral pons formation have disappeared except a small part of the ventral nucleus on the side opposite to the intact remnant of the lobulus ansatus, paraflocculus and flocculus. Thus, these nuclei, just as the lower olivary nuclei, are connected anatomically with the cerebellum. Winkler was not sufficiently certain as to the changes in the small celled part of the red nucleus to enable him to form a judgment. [Leonard J. Kidd, London, England.]

5. BRAIN; MENINGES.

Harbitz, F. Is Tuberculous Meningitis Curable? [Norsk Magazin for Laegevidenskaben, July, 1920. J. A. M. A.]

Harbitz cites evidence from the literature that tuberculous meningitis can pass into a phase of fibrous transformation which results in the complete cure of the active disease. Rössle has reported a case of chronic tuberculous meningitis in a woman of 37 with final fatal coma after seventeen months, and Harbitz here describes a similar chronic case with a five and possibly eight months' course in a man of 38 with necropsy findings showing mild tuberculous meningitis just entering a phase of anatomic healing. Another feature of the case was the spreading of the infectious process along the blood vessels into the brain and spinal cord, thus presenting the picture of diffuse tuberculous encephalitis and myelitis. In 60 per cent. of cases of tuberculous meningitis, the patients are infants, and in them it is invariably fatal. The instances of a chronic course and recovery are nearly all in adults, the resisting powers or increased immunity aiding in the struggle against the infection. Epidemic cerebrospinal meningitis often entails hydrocephalus and changes in the brain, with mental disturbance. But tuberculous meningitis seems to escape this tendency. If the patient recovers he is not left with defects. Lumbar puncture and tuberculin treatment may contribute to the favorable outcome. In conclusion Harbitz cites a case from Overland's practice in which a girl of about 7 had long presented symptoms of tuberculous meningitis, but finally recovered and in time married and has borne two children.

Hollis, Austin W., and Pardee, Irving H. TUBERCULOUS MENINGITIS AND ANTIMENINGOCOCCIC SERUM. [Arch. Int. Med., July 15, 1920.]

Thirty-eight undoubted cases of cured tuberculous meningitis are reported in the literature and fifteen in which the diagnosis was doubtful. Except for these cases, hospital statistics show that the treatment has been ineffectual. Intraspinal injections of antimeningococcic serum combined with frequent spinal drainage, was used by the authors in two cases of tuberculous meningitis, and in two other possible cases, recovery following. Three cases in the last four years were treated by serum at St. Luke's Hospital with ultimate death. Of the successfully treated patients, three were young men in excellent physical condition with a localized meningeal form of tuberculosis. In the unsuccessful cases, two were those of men over 45, one alcoholic, one arteriosclerotic, the third was of poor physique. The injection has two distinct actions, it adds to the spinal fluid certain antibodies which it is unable to develop for itself, and it introduces within the dura a foreign protein, horse serum. The unilateral effect of the latter on the meninges produces a cellular response and a hyperemia about the site of any localized tubercle.

Aráoz, Alfan G. PSEUDOTUBERCULOUS MENINGITIS. [Arch. Latin-Amer. de Pediatría, May–June, 1920. J. A. M. A.]

Aráoz remarks that most of the cases that have been published of recovery from tuberculous meningitis were in reality of other origin. He makes an invariable practice of seeking for tubercle bacilli in the lumbar puncture fluid; many assert that if sought repeatedly and patiently for hours, they can be found in 90 to 100 per cent. of all cases of tuberculous meningitis. With negative findings he inoculates animals and begins mercurial treatment at once, as he is convinced that the meningitis with inherited syphilis, in infants or older children, and in the acute phases of the third stage of syphilis presents a clinical picture and lymphocytosis which deceptively simulate true tuberculous meningitis. Even with a history of syphilis, the meningitis may be a superposed tuberculous infection. The onset of syphilitic meningitis is usually more abrupt and stormy than with the tuberculous type; there is fever and there may be convulsions and a semicomatose state. The meningitis may be secondary to a vicinity reaction to otitis or secondary to mumps. The fluid cell count is predominantly polynuclear or mixed, and the high fever and intensity of other symptoms resemble more those with epidemic meningitis. Examination of the salivary glands may give the clue. One case is on record in which mumps meningitis merged into the tuberculous form. Meningeal reactions to alimentary intoxication in infants may prove misleading, but the lymphocytes are few in number and the glucose content is high; in one case it reached 1.1 per thousand. Leukocytosis is common, and the rapid improvement under restriction to water confirms the alimentary intoxication. The urea

content of the spinal fluid runs up high. Retention of urea in spinal fluid and blood from kidney disease may simulate tuberculous meningitis until laboratory tests have been made. Morquio has reported a case in which by exclusion tuberculous meningitis seemed the only diagnosis in spite of the absence of tubercle bacilli, but the child recovered after all.

Lannois and Sargnon. The Acute Otologic Meningitides. [Rev. de Laryngol., d'Otol., et Rhinol., 1920, July 15, p. 385.]

The writers treated a very large number of cases of acute otogenic meningitis at a military hospital during the War. They attribute their good results to early interference. The first thing is to suppress the focus of infection; thus, one curettes the whole of the mastoid and attacks every possible purulent focus under the dura or around the sinus. They treat these acute cases by daily lumbar puncture at the onset, and then every other day until all grave symptoms have disappeared; if any alarming symptoms reappear the lumbar punctures are repeated. In some cases they have added intraspinal injections of electrargol or of electraurol, but they are not sure of their value, for some of their acute cases recovered without them. In addition, whenever it was possible, they used large hot baths daily, at 39° to 40° C., for half an hour. After recovery from the acute meningitis, complications may occur, such as attacks of vertigo and epilepsy. [Leonard J. Kidd, London, England.]

Christiansen, V. Chronic Serous Meningitis. [Hospitalstidende Copenhagen, November 5–December 10, 1919.]

This author states that serous meningitis as an uncomplicated pathological lesion is not known for the posterior cranial fossa. It usually accompanied a tumor of the cerebellum or cerebello-pontine angle. In twenty cases of tumor in this region which he had observed in six years serous meningitis had been constant. It also occurs with tumors elsewhere in the skull.

Schenk, E. Circumscribed Serous Meningitis. [Deut. med. Woch., February 19, 1920.]

An old shrapnel wound of the cervical cord in a man of 31 was operated by laminectomy chiefly to relieve pain and avoid morphinism. Removal of the vertebral arches of C III–C VI, was done under local anesthesia. The dura was inflamed and without pulsation. Incision with scissors caused 30 c.c. of cerebrospinal fluid to escape under high pressure, after which the cord began to pulsate. Adhesions and membranes, which were extremely tough, were divided and removed. The patient began to improve at once. The following day the pain had almost disappeared. Later the sensory and motor phenomena regressed perceptibly. The injury to motion, however, proved to be irreparable.

6. BRAIN.

Constantin. Spontaneous Escape of Cerebrospinal Fluid through the Nose. [Rev. méd. de l'Est., July 15, 1920.]

This condition has been described by St. Clair Thomson in England; Freudenthal and Jelliffe (Chordoma) in the United States; Babinski, Sicard, Claisse, and Lévy in France; Wollenberg, Nothnagel and Adolph Meyer in Germany, and Noccioli in Italy, as well as others. In only a few cases have autopsies been performed. In four a cerebral tumor was found; in other cases the escape of cerebrospinal fluid was due to a fracture of the base of the skull or injury to the cribriform plate. In Constantin's case the phenomenon occurred suddenly, without any trauma or sign of a cerebral tumor. The rhinorrhea was observed to occur drop by drop from the right nostril exclusively at the rate of five drops a minute, or 860 c.cm. in the twenty-four hours. When the patient was in the horizontal position the discharge ceased, and the fluid was swallowed without interfering with the patient's sleep. Examination of the nasal fossae and skiagrams of the skull showed nothing to explain the condition.

Parnell, R. J. G., and Dudley, S. F. Severe Cerebral Toxemia after Intravenous Novarsenobillon. [Lancet, January 24, 1920.]

A case of secondary syphilis which was being treated with this arsenic compound is here reported. The first dose was 0.45 gm. producing no reaction and the second, 0.9 gm. given four days later produced no reaction until fifty-six hours after injection into the vein. The patient began to vomit and during the next three days he had a series of seven epileptiform convulsions with unconsciousness, biting of the tongue, incontinence of urine and feces, together with a macular eruption on the skin, marked cyanosis and failing pulse. Adrenalin injections, calomel in hourly doses, and lumbar puncture failed to relieve the symptoms, so oxygen inhalations were given to combat the evident anoxemia and caffein 0.2 gm. with urotropin 1.5 gm. in 15 c.c. of sterile distilled water was given to relieve the maniacal state, probably through the great diuresis resulting. Five hours after the injection was begun and the oxygen inhalations were started the patient had become entirely rational and thereafter made an uneventful recovery, though he suffered from a partial amnesia for fourteen days.

Lantuéjoul. Spontaneous Coagulation of Spinal Fluid. [Rev. Neur., April, 1920.]

Lantuéjoul reviews the literature on spontaneous and massive coagulation of the lumbar spinal fluid. Of the 38 cases he has compiled, there was meningitis in 5 and paraplegia in 28. Spinal fluid drawn by puncture at different levels was normal at the higher levels. Of the total 38 persons, 14 have died, and only 5 can be considered cured. Massive

coagulation of spinal puncture fluid must therefore be considered a sign indicating a grave prognosis. Xanthochomia was pronounced in all but one case. The coagulation is due to an often enormous increase in the albumin content and to the presence of an abnormal constituent, namely, fibrin. Necropsy in 11 of the cases showed that the lower portion of the subarachnoid space was shut off either by the meninges growing together or by compression. The repeated lumbar punctures gave great relief. Froin was the first to call attention to this massive coagulation of the spinal fluid. [J. A. M. A.]

Barbé, A. Permeability of the Choroid Plexus. [Rev. Neur., April, 1920.]

Cadaver experiments on the permeability of the choroid plexus showed that human blood serum transfused readily. Certain variations in different diseased conditions are noted. Thus permeability is increased in paresis and diminished in some epileptics.

Tanaka, Fumio. Absence of Lobus Olfactorius and Sclerosis of Cornu Ammonis. [Am. Arch. Neur. and Psych., August, 1920.]

The very rare condition of a brain without olfactory tracts is described with minute account of the macroscopic and histologic findings, together with history of patient with epileptic dementia from whom the brain was taken on necropsy. There were bilateral absence of the bulbus and tractus olfactorius, rudimentary development of the trigonum olfactorium in both hemispheres, absence [left] and partial development [right] of the sulcus olfactorius nondevelopment of the gyrus olfactorius medialis and lateralis as well as of the gyrus tuberi olfactori in both sides, absence of the stria olfactoria and some atrophy of the gyrus hippocampi in both hemispheres. The rhinencephalon showed no notable alateration. The absence of the gyrus olfactorius medialis and lateralis and the gyrus olfactorii and the stria olfactoria would not be of importance in regard to the question of the olfactory center. It was not possible to obtain any information regarding the patient's sense of smell during life. The origin of the defect of the olfactory lobe is believed to develop when some compression acts on the head fold of the embryo. Tanaka believes that the defect in his case had its origin in a defect in embryonal tissue. As explanation of microscopic changes found in the cornu ammonis, in addition to the anomaly of the olfactory lobe, arteriosclerosis may be taken into consideration, but the patient did not have arteriosclerosis and the basal arteries showed only slight hardening. There is no evidence of any kind of intoxication which might cause these marked changes. The cornu ammonis therefore appears to be affected by the defect of the olfactory center, and the author concludes that the cornu ammonis must be regarded as the terminal olfactory center. Sclerosis of the cornu ammonis has been noted before in some cases of epilepsy, thus making the final conclusion on this point uncertain. [Stragnell.]

de Vries, E. Gliosis and Sclerosis. [Nederland. Tijdschr. voor Geneeskunde, 1920, May 29, p. 2000.]

de Vries has shown to the Amsterdam Neurological Society a case of glioma, occurring in an old dipsomaniac woman, that ran the course of a dural hematoma. The aspect of the tumor varies in relation to its site. In the right occipital lobe, in which it probably originated, there is cortical gliosis, the convolutions having preserved their shape, but being broader and whiter than normal and of irregular surface. Microscopically the tumor here consists of small round glia cells with definite body protoplasm but mostly without processes. The ganglion cells here lie between them or else are already atrophied. In places where the changes are not yet so marked, glioma cells often lie in the areas where the original glia cells are situated (satellite cells next to the ganglion cells, along the vascular sheaths). Here one has the impression that the preexistent glia cells have themselves become tumor cells as soon as the process came near them, and that thus we have here an infective and not an infiltrating growth. In these sclerotic convolutions there is no glia reaction with formation of astrocytes or ameboid cells. In other places the picture is quite different: the tumor appears there as an astrocyte glioma or a sacro glioma, while in one place there are giant cells in the tumor tissue, with a ganglin like aspect. Where these parts of the tumor lie immediately beneath the cortex they provoke a glia reaction such as we see everywhere from irritation, viz., increase and ameboid enlargment of the cells. de Vries here showed preparations from a case of apparent brain tumor; there was here a diffuse increase of the glia. A similar condition is found in some idiots where the brain is indurated from the diffuse glial increase, especially in the cortex. Also in epilepsy this form of gliosis occurs. In other cases the greatest change is found in the medullary substance. A case was shown in which extensive fiber degenerations occurred in the medullary substance, probably due to a glial proliferation, as is never found in ordinary secondary degeneration; the U-shaped association fibers escaped. In the cortex there was induration and there were small warts on its surface; the cerebellum also was wrinkled. Finally, de Vries showed two cases of lobar sclerosis, one in an adult, the other in earlier life; here the predominant feature is the destruction of ganglion cells, the glial proliferation being slight and probably secondary. [Leonard J. Kidd, London, England.]

Rietz, T. Narcosis Tremor and its Treatment. [Surg. Gyn. and Obst., April, 1920, Vol. XXX, No. 4.]

The author calls attention to a tremor during general anesthesia hitherto not described and shows a method to obviate this inconvenience.

Norcosis trembling resembles very much a series of frequent rhythmic muscular contractions. These are sometimes so violent that they

are almost mistaken for clonic cramp. The trembling attacks chiefly the lower extremities, but sometimes the trunk is also involved. The spasm remind one most of the findings in cases of intense tremor, of epileptic attacks, or spasms from other cortical irritation.[1] Usually the trembling comes on suddenly, without warning, and as a rule immediately reaches its full intensity; then, after a longer or shorter period it disappears as suddenly as it appeared. There are no single detached spasms later, such as one sees in eclampsia or epilepsy. The phenomenon always appears as a series of rapid spasms at regular intervals. Sometimes the trembling appears only as slight, rapid, spasmodic jerks lasting for a fraction of a minute. In some cases the trembling continues as long as five minutes and in some cases even longer.

Thirty-three cases in all have been observed during the years 1912 to 1919. With two exceptions only, the patients were men.

Because of the character and course of the attacks in our series, we feel justified in comparing them with the rhythmic contractions which occur in a number of other conditions and which are considered to depend on an abnormal irritation, influencing in some manner the motory courses. This is generally believed to occur in the cortex of the brain, but as to the nature of this disturbance, we know very little.

The narcosis tremor must be due to an irritation which is produced in some manner by the narcotic which is conducted to the brain through the circulation of blood.

Neither the hospital records nor the objective examination of the patient has afforded any exact means of determining the factors which may possibly be considered as favoring the appearance of the above described spasms. We are forced to assume that the abnormal irritation which produces these motory symptoms has some connection with a special sensitiveness in these patients.

On the hypothesis that narcosis tremor is the result of an abnormal irritation of the brain produced by the anesthetic which is conducted thither by the blood, Rietz has endeavorder to overcome this phenomenon. To eliminate, at least for a moment, the influence of the irritated motor centers, during an operation on a boy of 16, he pressed, for a few seconds, on the neck in the fossa carotica. The result was evident at once; the narcosis tremor disappeared as by magic. It appeared again, however, when the pressure was removed. Renewed experiments had precisely the same effect. When pressure was again applied for a somewhat longer period (about one quarter minute), the spasms ceased definitely.

Although on some occasions the monoeuvre had doubtful results or none at all, continued observations still showed that the measure was of value. As regards the effect of pressure, the cases may be divided into three groups. The first includes those patients in whom compression

[1] Among the many forms of tremor which have been described, are also the groups, cerebral tremor and the so-called cerebral form of toxic tremor.

gave a positive result. By this the author means that the spasms immediately decreased in force, or ceased altogether after the application, by means of a regular grip, of pressure on the designated spot. If the pressure is applied for only a short time, the tremor usually returns; a somewhat longer application of pressure on the other hand stops the tremor definitely.

The other group includes cases in which the results were not decidedly positive, and the narcosis spasms possibly ceased of themselves, or circumstances rendered the investigation incomplete.

Finally come the cases in which compression was ineffective. In the 33 cases mentioned the measure was used 29 times; 4 patients had short spasms which ceased of themselves and did not call for treatment.

The other 29 cases fall into three groups as follows: In Group I, the effect was certain in 19 cases; in Group II, the effect was uncertain in 5 cases; in Group III the effect was nil in 5 cases.

In no way does the result vary in so far as the degree of unconsciousness is concerned nor does the result bear any relation to the duration of the narcosis.

The technique used in exerting the pressure is extremely simple. In the position in which the narcosis nurse generally sits it is perhaps difficult for her to apply a sufficiently powerful downward pressure in the carotid fossa. It is easier to apply pressure in this region if one stands at one side of the patient and turns his head over toward the other side.

There is still a question, however, as to whether compression of the blood vessel is the principal requisite. In order to ascertain if this is so Rietz has pressed hard, for instance, on the nerves of the axilla and has sought, by other means which affect the centripetal nerves and produce pain, to obtain the same result as by the method described. All such experiments have given absolutely negative results. [Author's abstract.]

Craigie, E. H. The Relative Vascularity of Various Parts of the Central Nervous System of the Albino Rat. [Journ. Comp. Neurol., 1920, XXXI, June, 429.]

Craigie has made anatomical measurements of the capillary richness in twenty-one regions arbitrarily selected in the spinal cord, bulb and cerebellum of the albino rat and has presented their ratios in tabular and graphic form. He believes that these values really show in a fairly reliable manner the relative richness of the capillary supply. His results are as follows: (1) the gray matter is much more richly supplied with capillaries than is the white matter, the poorest of the gray being nearly half as rich again as the richest part of white among the regions studied; (2) all parts of the white matter are not equally vascular, the pyramidal tract, the richest part of the spinal cord, being about twice as rich as the fasciculus cuneatus, while the fasciculus longitudinalis dorsalis in the bulb is still richer; (3) the gray centers can be sharply divided into two

groups, the motor nuclei and the sensory and correlation centers, of which the latter are richer than the former. Though the richest motor region (ventral cornu) is but little poorer than the poorest sensory one (spinal V nucleus), the two groups do not overlap in the case of those regions studied, except in a few individuals. The substantia gelatinosa Rolandi of the spinal cord is the only part which does not conform with this statement; (4) the richest of the centers observed is the dorsal cochlear nucleus which is more than half as rich again as the ventral cornu, about two and a half times as rich as the substantia gelatinosa Rolandi (the poorest gray region), and eight times as rich as the fasciculus cuneatus; (5) great individual variations occur, and the two sexes do not seem to show any constant difference. [Leonard J. Kidd, London, England.]

Abt, T. A., and Tumpeer, I. H. Significance of Xanthochromia of Cerebrospinal Fluid. [Am. Jl. of Dis. of Child., September, 1920.]

Canthochromia occurred in an infant of eight months who lived thirty-seven days. There was marked internal hydrocephalus, pyelitis and bronchopneumonia. The yellow C. S. F. was attributed to a meningoencephalitis with subpial hemorrhage.

Coupin, F. Absence of the Foramina of Magendie and of Luschka in Some Mammals. [Compt. rend. Soc. de Biol., 1920, LXXXIII, June 26, p. 954 (4 figs.).]

The existence of the median foramen of Magendie and of the lateral foramina of Luschka in man has been denied by some anatomists. Coupin has examined mice, rats, guinea pigs and young cats and rabbits. He regards the conclusions drawn from the method of colored injections on living animals as unreliable, and also those made postmortem; the roof of the fourth ventricle is very fragile, so that one cannot exclude the possibility of its rupture by the injected fluid. So he has used dissections and necroscopical sections. If care be taken to avoid traction on bulb and cerebellum, one sees complete continuity of the ventricular roof, and there is no visible perforation in the calamus scriptorius region. Study of serial sections shows also absence of Luschka's foramina; in the lateral recess of the bulb the epithelium of the choroid plexus is seen to be continuous with the ependymal epithelium. Thus, the fourth ventricle is everywhere limited by an epithelium, and these co-called foramina are artefacts. In all the mammals studied Coupin finds that there is no direct communication between the ventricular cavity and the subarachnoid spaces. [Leonard J. Kidd, London, England.]

del Río-Hortega, P. Transformation of the Microglia. [Arch. de Neurobiologia, June, 1920.]

This well illustrated study of the normal and pathologic microglia showing the transformation of the branched glia cells into long drawn

out, rodlike shapes and granule cells and throws light, the author thinks, on the so-called rod-cells of Alzheimer. The most striking specimens of these rod-cells were from paretics.

Weed, L. H. The Cells of the Arachnoid. [Bull. Johns Hopkins Hosp., October, 1920.]

Lewis H. Weed discusses the general morphology of the cells lining the subarachnoid space; changes in the cells under physiological activity; changes in arachnoid cells conditions by age and ultimate changes in the arachnoid cell-clusters. From his studies he concludes that the arachnoid mesothelial cells are normally of a low, flat type, but their morphology depends upon the particular physiological state of the cells at the time of examination. Under the stimulus of particulate matter and in acute infections, the cells increase in size, become phagocytic and at times form free-moving macrophages. Other changes in the growth of the arachnoid cells lead to the almost invariable formation, in the older animals, of cell-clusters, slowly progressive overgrowths, at times undergoing calcification and less frequently seemingly related to the formation of endotheliomata. Hence, the morphology of the cells of the arachnoid may be said to depend not only upon the location of cells (as on the membrane or in an intradural cell-column) and upon the physiological state of the cells (as under the stimulus of particular matter and infection), but upon the age-condition of the animal (as in the arachnoid cell-cluster). [Med. Rec.]

Meyer, A. Herniation of Brain. [Am. Arch. Neur. and Psych., October, 1920. J. A. M. A.]

Cases illustrating various types of herniation under the falx and under the tentorium and into the foramen magnum are recorded by Meyer. They give an interesting quasi-experimental picture of the topography and at least in two instances collateral consequences of possible importance among the so-called distant symptoms of brain tumor. One case of glioma of the left opercular region, shows, besides a moderate cerebellar wedging into the foramen magnum, a characteristic sagittal "tentorial line" on the left uncus, not to be taken for a sulcus semi-annularis Retzius. A glioma of the anterior and middle hindbrain segment showed similar tentorial lines dues to slight hydrocephalus. A most extensive prolapsing glioma of the left temporal lobe with death in coma showed a frontal herniation under the falx and a marked subtentorial herniation of the uncus. A cancer metatasis with a cyst in front of the paracentral lobule lead to herniation of the fornicate gyrus under the falx and subtentorial herniation of the uncus. A cancer metastasis with a cyst in front of the paracentral lobule lead to herniation of the fornicate gyrus under the falx and subtentorial herniation of part of the uncus and of both subicula, with a striking impingement on the calcarine branch of the posterior cerebral artery and collapse of

the corresponding part of the occipitatemporal cortex; hence providing a foundation for hemianopsia. An aneurysm of the circle of Willis just in front of the optic tract and chiasma impinged on the circulation of the right hemisphere, with swelling of the right hemisphere without actual softening or infarction, but marked herniation of the subiculum; left hemiplegia and hemianesthesia, three days later coma, and nine days later death. An hemorrhagic cancer metastasis in the right postcentral gyrus led to subtentorial herniation and to wedging of the cerebellum. An unusually great subtentorial herniation occurred in a case with a cystic glioma extending from the right frontal lobe to the right occipital lobe, without, however, occluding the calcarine artery. Wedging of the cerebellum was added as a secondary consequence. A cancer metastasis in the inferior semilunar lobule of the cerebellar hemisphere led to cerebellar herniation into the foramen magnum and to an interesting supratentorial distention of the region of the splenium, with death eight days after a subtemporal decompression. Moderate wedging of the cerebellum in a child of ten months, with convulsions and brain swelling, but no focal lesion, led to a case of marked wedging of the cerebllum, distention of the hindbrain and forebrain ventricle; severe frontal headache, lumbar puncture, followed by aggravation and disturbed vision and death in three weeks. A suspicion that herniations of the subiculum might be responsible for the sclerosis of the cornu ammonis in epilepsy through the effects of transitory subtentorial herniation is not, so far, corroborated by this series of cases.

Book Reviews

Berman, Louis. THE GLANDS REGULATING PERSONALITY. The Macmillan Co., New York.

This fascinating volume comes as almost the first attempt to formulate a complete synthetic psychosomatic view of the personality. Heretofore many one-sided presentations of the personality have been presented. Loeb would attempt a tropistic synthesis; the behaviorists a historical experimental viewpoint; the out-and-out spiritualists a purely psychical or transcendental definition.

The author here believes that a synthesis of clinical, chemical, physiological and pathological endocrinology in coördinated activities with the vegetative nervous system is capable of providing an adequate material for synthesis and for a working hypothesis. The reviewer believes he has not only in a most readable manner advanced his thesis, but that with true scientific imagination has effected a number of most fruitful hypotheses. It is apparent that a true dynamic constellation pathology is being attempted, and from many sides. Kraus in his General Pathology of the Personality, Jelliffe and White in their Diseases of the Nervous System, Biedl in Endocrinology, Ritter, Bauer, Tendeloo, Lubarsch and many others too numerous to mention in all fields of scientific activity are hot on the trail of trying to understand the workings of the organism as a whole. The day of static, descriptive pathology of this organ or that organ has gone by; organization, interlocking directorates, synthesis, working toward some teleological aim, this is the more satisfactory constellation, pathology's ideal.

Berwin arranges his mosaic on an endocrinological framework. His speculative ideas are suggestive and we believe useful. We feel in one respect that criticism may be advantageously applied. There is too much emphasis laid upon really a limited group of what after all are purely somatic chemical factors. Important though they may be as phyletic inheritance determiners, this is only one side of the picture. Kappers has shown the transcendent importance of neurobiologic factors as influencing somatic characters. Environmental stimuli, then, must not be neglected. They represent the opposing pole, the ambivalent mechanisms, to the somatic phyletic heritage. Most important of these for mankind are the sociotropic stimuli making for the civilization and culture of the present and for future generations. While Berwin has not entirely left these out of account, particularly as they are valuated in the important Freudian hypotheses, we still believe that he has clung a little too tenaciously to the machine that carries on the job, and not enough to the purposes to which the machine may be applied. The endocrines are servants of the nervous system. They are not its masters.

Notwithstanding our divergence from the author as to where the chief accent should be laid, we hold he has given us a most important piece of work—which, differing in its mode of presentation from most works of the kind in its easy readability, enhances rather than detracts from its value. It is a distinct contribution to the building up of a constellation pathology toward which the hopes of the future are directed.

Harrow, B. From Newton to Einstein. D. van Nostrand, New York. $1.00.

For a handy short and readable account of what Einstein's relativity theory really is, what it attempts to accomplish, and how well it may be said to answer certain heretofore irreconcilable mathematical problems, questions concerning the nature of time, of space, and of gravitation and the fourth dimension, this handy volume, now in its second edition, can be most heartily recommended.

Hutchinson, J. Facial Neuralgia and its Treatment. W. Wood & Co., New York.

The author here revises and puts into a more useful form his excellent monograph of 1915. He treats in a full and very readable manner the various methods of handling trigeminal neuralgia in all of its many forms. Alcohol injection methods are freely discussed and his reasons stated for his preference for gasserian section given. It is an admirable short treatise.

Whitaker, J. R. Anatomy of the Brain and Spinal Cord. E. and S. Livingstone, 17 Teviot Place, Edinburgh.

This is the fifth edition of this handy short account of the Anatomy of the Brain and Spinal Cord. With the increasing importance which is making itself felt in the direction of dynamic neurology this cut and dried method of handling the nervous system is becoming displaced by a more vital and physiological anatomy, yet as this is more or less of a dissector's manual the old-fashioned static descriptive anatomy may be allowed to have some use. Of the works of its kind it is excellent. The illustrations are useful.

Pfeifer, Richard A. Myelogenetisch-anatomische Untersuchungen über das korticale Ende der Hörleitung. B. G. Teubner, Leipzig.

Pfeifer here, following the general methods that Flechsig has originated and carried out in the brain-anatomical institute of the Leipzig Psychiatric Clinic, has offered a reconstruction of the cortical ends of the auditory pathways. He shows that the general law of Flechsig holds true for the auditory system as well as for others, namely, that the projection systems of the sensory pathways are myelinated earlier than the association systems. The cortical area for the auditory function lies in a portion of the temporal lobe lying

hidden in the Sylvian fissure. It constitutes but a small part of the entire cortical superficial area—about 2 per cent.—and certain variations with reference to localization are pointed out. Pfeifer is not opposed to criticize Brodman's topographical cytoteconic ideas. The general light thrown upon the phyletic development is of interest. Some of the conclusions to which he comes are as follows: (1) The anterior transverse gyrus of the temporal lobes possesses an individual projection system; (2) there is sufficient evidence to show that this projection system belongs for the most part to the auditory apparatus; (3) this projection system is demonstrated by serial section to be a closed system; (4) in the course of the phyletic development a twisting has taken place in the course of the fibers from the internal geniculate to the tegmentum, thus explaining the anomolous relations of the auditory pathways to the internal capsule; (5) the auditory pathways enter in large curves from front below into the transverse convolution and only the median portion runs in the white matter the length of the transverse gyrus; (6) thus the anatomical basis of sensory aphasia has a new basis; (7) Henschen's theories appear in a new light, since the precise relations of the pathways to the cortex must be viewed in a different manner; (8) variations in the anterior entering auditory pathways vary considerably, enabling Pfeifer to mark off two types of central convolution—the steep and the flat; (9) all cases of amnesia from so-called parietal pole foci need to be revised to see if auditory pathways are not involved; (10) the great variability of the end district of the auditory system, determined chiefly by the position of the transverse convolution, makes it impossible to state that the auditory zone occupies one third of the temporal lobes. There is a possibility in the steep type that the middle third of the first temporal convolution will lie outside of the hearing endings. In flat types of the temporal convolutions deep-lying foci may leave the auditory pathways undisturbed even when occupying the general region of the anterior third of the first temporal convolution. The association sphere—planum temporale—acquires a new significance from these researches.

This short study is a sincere and valuable contribution to our knowledge of the development of the auditory projection system.

JELLIFFE

Rixon, C. H. L., and Matthew, D. ANXIETY HYSTERIA. Paul B. Hoeber, New York.

This we hold is a readable little book upon some of the manifestations of repression and conversion mechanisms of Freud as applied in a hazy, unsystematic manner to the study of some examples of the war neuroses. The author borrows fragments of the Freudian psychology, but says he does not use it because it connotes pansexualism, which general viewpoint he shares with many others. With them also he shares the universal cowardice of human beings to face reality and the characteristic hypocrisy of the politician who plays up to popular prejudices to get the votes. The book contains nothing save to the novice, albeit well put with a smattering of MacDougal and his

seven instincts. Why he should call it "modern" views on some neuroses it is difficult to understand.

Monrad-Krohn. Clinical Examination of the Nervous System. H. K. Lewis & Co., London.

This small sketch of 135 pages is a very orderly systematic presentation of a less than minimum requirement in modern neuropsychiatric practice. It is quite practical and could be utilized to advantage for an introduction to case examination of medical students or to medical practitioners who want a simple series of formulae for examining the sensori-motor functions of the nervous system.

Nonne, Max. Syphilis und Nervensystem. Vierte Auflage. S. Karger, Berlin.

This, the fourth edition of Nonne's valuable series of lectures on neurosyphilis, comes after five years of the war during which all European medical energies were focussed upon but one objective. Nevertheless neurosyphilis is such a large subject that we must always have it under observation, and the war only brought old problems, especially those relating to paresis, fatigue, trauma, etc., to the fore.

Nonne has not changed the character of the book. He has revised it most conscientiously and added much from the observations of others during the past five years, so that it is practically up to date. No student of neurosyphilis can neglect this recent contribution. It contains a great many new things and revised judgments about older ones. Thus the newer malaria infection treatment of paresis is very thoroughly discussed, the general verdict being optimistic, but arsenic and mercury still remain necessary.

There are many points that one would like to take up in a review, but it is quite impossible. The new edition is a distinct addition.

Petren, Karl, Faber, Knud, and Holst, P. F. Larobok Intern Medicin. Bd. I–IV. Gyldenalske Boghandel. Kjobenhavn og Kristiania.

We have singled out but three names from this important Skandinavian Textbook of Internal Medicine, although a large number of Norwegian, Swedish and Danish authors have contributed to it. Bergmark of Upsala, Holmgren of Stockholm, Krabbe of Copenhagen, and K. Petren of Lund are among the neurological contributors. It is a monumental work to be completed in four large octavo volumes, two of which only have reached the reviewer. Volume I deals with Infectious Diseases.

Intestinal Parasites and Intoxications.—Volume II takes up Respiratory Syndromes, Circulatory Syndromes, Mediastinal Tumors and Inflammations, Blood Disorders, the Disorders of the Spleen, and the Hemorrhagic Diathesis.

We will await with much interest the volumes devoted to the Nervous System, as the high quality of the work already presented indicates valuable contributions to that side of the work that interests our readers.

Kraepelin, Emil. EINFÜHRUNG IN DIE PSYCHIATRISCHE KLINIK. Vierte Auflage. Johann Ambrosius Barth, Leipzig.

The fourth revised, rewritten and enlarged edition of Kraepelin's well-known introduction to clinical psychiatry now appears in three compact volumes. The present edition maintains the striking character of Kraepelin's clinical descriptive clarity and behavioristic observationalism. He is a keen observer of the actions of the mentally ill and has a definite talent for picturing what happens. If this were only combined with as deep an intuitive capacity for understanding more of the why! But enough is enough and description and systematized observation must precede genetic and interpretative formulae. It is a masterly expose of clinical psychiatry.

Radhakrishnan, S. THE REIGN OF RELIGION IN CONTEMPORARY PHILOSOPHY. Macmillan & Co., London and New York.

The author is professor of philosophy in the University of Mysore, India, and his work is of special interest as a review of occidental philosophies seen from the background of the eastern training and the Oxford traditions.

The book, as the author states in his preface, attempts to show that of the two live philosophies of the present day, pluralistic theism and monistic idealism, the latter is the more reasonable as affording to the spiritual being of man full satisfaction, moral as well as intellectual. He believes that systems which play the game fairly, with freedom from presuppositions [how biologically possible, he does not state] and religious neutrality [how obtainable when religious function is so little known?], naturally end in absolute idealism. If they lead to other conclusions, he says, one may suspect that the game has not been played according to the rules. [Whose rules?]

Current pluralistic systems, he holds, are the outcome of the interference of religious prejudice with the genuine spirit of speculation. His reviews of modern philosophical schemes have behind them the object of showing how religion in many disguises serves to swerve philosophy from the highroad of an absolute security. These reviews are made of current schools of philosophical thought. Leibniz's Monadism, James Ward and his school, Bergson and Absolute Idealism, Pragmatism, The Pluralistic Universe of James, Eucken, Bertrand Russel and the Upanishads and Personal Idealism, these are in general the chapter heads under which his most entertaining material is arranged.

The reviewer has read some chapters, skimmed others, and dug deep into a few pages, and believes that the neuropsychiater can derive much profit from the careful reading of the whole. It is a refreshment to have the current philosophies so well presented and a great aid to laying aside prejudice to see how religious dogmas clutter up our thinking apparatus and how fiercely such religious schemes fight to keep the human mind bound to guard it from fears and phobias. Only too frequently is the idea rerepresenting itself that religion may serve the function of a delusional belief for many sick

souls. Pure religion, undefiled, is not a matter of dogma, nor form, this ism or that, but real creative activity going out into social reconstruction. Religion as a delusional defense reaction, and thus it functions for too many, is an index of a sick soul that must be kept in line by the fear of God. How all this, as a side issue, appears in these most readable pages must be left to the individual imagination.

Nissl, F., and Alzheimer, A. Histologische und Histopathologische Arbeiten über die Grosshirnrinde. Ergänzungsband. Gustav Fischer, Jena, 1921.

Sixteen years ago this series was founded by these two gifted investigators, both of whom have died. This last volume, made possible by the publisher, G. Fischer, who has always taken a keen personal interest in scientific productions, and through the support of Kraepelin's newly founded Research Institute, contains two important monographic studies—one by Gerhard Creutzfeldt, on a peculiar focal disease of the central nervous system, and the other by Hugo Spatz on some experimental work on cross-section of the spinal cord, with special reference to the reaction of different embryological tissues. A complete index of all of the volumes is an indication of the close of this series of "Arbeiten."

Creutzfeldt's study was of a girl in whose family there were two idiots, and who began to have an unknown nervous disease at the age of two, possibly on a constitutional basis. This advanced in steps, with longer or shorter remissions. The symptoms were motor irritative signs, indicative of motor and sensory loss and loss of sensory cortical function, but also with signs of involvement of intracerebral association pathways (cortico-striato and cortico-thalamic). Added to these were mental defects which gradually assumed the character of a dementia with an acute amentia type of psychosis at the terminal stages with striking psychomotor symptoms.

Coma epilepticus closed the story. Two types of pathological change are recorded: (1) a progressive, non-inflammatory focal destruction of nerve tissue of the cortex with plasma glia reaction showing itself in substitute and Abraüm process accompanied by vascular proliferation, and (2) an acute diffuse cell disease, leading to the falling out of individual cells of the entire central gray substance, with or without glia reaction.

Spatz's study of nearly 400 pages is a complete monograph of an experimental research on fully developed and still growing rabbits, with the view to determine the different reaction principles governing "unripe" and "ripe" tissue elements. These are then compared to human pathological problems as seen in porencephaly and in syringomyelia, especially in all those forms in which congenital factors may be suspected. The details are too complicated to present here. A worthy ending to a most valuable series of Arbeiten.

Müller, A. Bismarck, Nietzsche, Scheffel, Mörike. Four Case Histories. A. Marcus and E. Webers Verlag, Bonn.

The author would elucidate the personality of certain well-known

individuals on the basis of their nervous disorders, a topic of perennial interest, and constituting the gossipy side of this branch of biography.

The reviewer is of the opinion that in the main much of this type of work is wide of the mark. The man is not to be interpreted on the basis of his illnesses. What they accomplished—if great men—has nothing to do with their illness, save in a much more complicated manner than is ever presented, save by the studies issuing from the psychoanalytic school. These latter studies show how a man's illnesses may be interpreted as compensating mechanisms chiefly for his failures to live to the full the creative capacities imbedded in all men.

This monograph shows no inkling of this general viewpoint, but harks back to the "forms of neurasthenia" these men showed. A profitless waste of words.

Dreyfus, Georges L. Isolierte Pupillenstörung und Liquor Cerebrospinalis. Gustav Fischer, Jena.

Dreyfus has given us a number of very valuable studies beginning as a student in Kraepelin's clinic on dyspepsias and their relation to manic depressive psychoses. Since his removal to Frankfurt, now 10 years ago, he has steadily applied himself to neurosyphilitic research and made a large number of valuable contributions.

This small monograph of approximately 100 pages summarizes a large number of observations made during this time, chiefly as director of the nervous department of the state hospital Sandhof of Frankfurt, a/M. These studies seek to establish chiefly through the evidence afforded by complete investigations of the cerebrospinal fluid the relationships between isolated pupillary changes and syphilis. While it has come almost to be a dogma that these pupillary changes mean syphilis, the better informed know that such a dogma is false. A number of variable factors are possible. Dreyfus here gives a thorough analysis of many of these perplexing problems of clinical neurology. The monograph is well done and will be found useful. There are no new situations which have not already been presented by our own neurosyphilitic students, especially Southard's and Solomon's valuable monograph. Practically only German work is considered.

Cook, William G. H. Insanity and Mental Deficiency in Relation to Legal Responsibility. E. P. Dutton & Co., New York.

This originally appeared as a thesis for the Degree of Doctor of Laws in the London University and as such casts an interesting and valuable light on the scope of the English educational schemes for the legal profession.

It deals chiefly with problems of legal responsibility, but from the standpoint of English statutes. Inasmuch as many of our own are like these, the work can be consulted to advantage here. In the main,

however, the whole problem is "muffed" by the author. He still talks about "insanity" as a reality. He does not yet grasp it as a legal abstraction only and hence prates about the medical definition. There is no medical definition of a legal abstraction. Medicine is interested in a group of processes which it terms illnesses, diseases, or, in the mental sphere, psychoses. If an individual, by reason of a psychosis, comes within the limits of an existing statute, and these statutes vary all over the globe in their details, for the purposes of law he may be abstractly regarded as "insane," and society can then do with his person or his property, or both, what its statutes have laid down it could or could not do. If this very simple series of notions could be grasped by the legal-minded, much verbiage curtailed and misunderstanding could be removed.

The American Psychiatric Association have come to an understanding of what these psychoses are and have attempted a series of limiting descriptive terms so that for their purposes the whole study of the psychoses and the many administrative problems involved are made more uniform. It is to be regretted that the author knows so little of these types of studies and only repeats old, moth-eaten, rubbishy, legal conceptions of disease processes and hopes to build up on such rotten timber a sound constructive medical jurisprudence.

So far as he goes his discussions are admirable, but they are so useless.

Lhermitte, J. La Section Totale de la Moelle Dorsale. Imprimerie Tardy-Pigelet et Fils, Bourges.

Among the recent studies devoted to anatomical and clinical spinal-cord syndromes this one of Lhermitte's stands out as of striking value. This is due not alone to the rich material which the ruthless experiments of war have provided, but also to the clinical care with which the syndromes have been studied, as well as the patient microscopical work which has pursued the symptoms to their most logical ends.

These researches have special value in that they have been carried out with young healthy individuals who have suddenly acquired their injuries. Furthermore, they have been limited to lesions of the dorsal cord. In this manner the study of bladder and rectal functions can be pursued without the complexities encountered in lesions of the lumbar and sacral regions.

Historical considerations are rapidly summarized, beginning with the earlier studies of Brown-Séquard and ending with those of Head and Riddoch. Then follow the "Facts," the case histories with the anatomical findings. The author brings into relief first a phase of *shock* and then a phase of *spinal automatism.* These two phases present marked contrasts and in the many evolutionary stages between them may be found many of the fragmentary formulations with which neurological literature has been burdened.

In Chapter II Lhermitte very clearly summarizes the clinical evidence of complete interruption. First the phase of shock. Absolute loss of motility. Complete loss of sensation of *all qualities*

below the spinal segment wounded. Obscure, unprecise and non-localizable subjective sensibility disturbances result from the necessary radicular complications. Tendon reflexes are abolished. Muscle tonus—the question is uncertain. Cutaneous reflexes are variable. Those of the sympathetic are not abolished. The plantar reflex is the usual flexor type, and this type, according to Lhermitte, affords evidence of total section, although he maintains that an extensor response should not be held incompatible with total section of the cord in the phase of shock. Urinary retention from spasm of the uretro-vesical sphincters is the rule, whereas incontinence of feces is more apt to occur. The pilomotor and the scrotal reflexes are conserved. Anidrosis is usual, but not absolute. [See André Thomas, Le Reflex Pilomoteur, 1921.]

After a variable period the later phase of *spinal automatism* sets in. Flexion movements of defense, massive and violent, set in. These may be induced in a great variety of ways. Sensation remains abolished, although tuning-fork tests show a loss of bony sensibility with often a retention of acoustic perception. Subjective sensations of variable quality and character persist and are as yet unanalyzable. Vesical power returns. It is of a purely automatic character, however. Visceral sensibility remains lost for the most part. Muscle tonus may remain normal, or hypertonicity may be present. Certain muscle groups show variable tonus characteristics. Certain tendon reflexes may return. Skin reflexes may be augmented in the automatic phase. Lhermitte reports the inversion of the skin plantar reflex in four cases histologically verified as total section. In three of these the Babinski reflex was unilateral. This section contains an admirable résumé of the so-called *defense reactions* and the spontaneous, automatic movements so amply recorded in recent war neurology of the spinal cord. The behavior of the bladder and rectal sphincters in Lhermitte's experience bears out, in the main, the observations of Head and Riddoch. Incontinence is not a pure syndrome. The human being does not behave exactly like the experimental animal of Sherrington. Spontaneous and regular automatic discharge from the bladder is the rule. Rectal automatic discharge tends to follow similar principles, but apparently there are complicating factors; but there are also here as yet unanalyzable variations. The usually conceived rectal incontinence is a false incontinence. Interesting facts relative to automatic genital functions are reviewed, as are also circulatory disturbances, edemas, bed sores, sweat mechanisms, which are usually suppressed in the anesthetic areas and conserved or exaggerated in the paralyzed segments. The findings of André Thomas for the vegetative reflexes of the pilomotors, scrotal, vasomotor and vascular tensions are verified.

Lhermitte then considers the terminal or cachetic phase.

Chapter III is devoted to the pathological findings. The meninges, fiber pathways, gray matter, spinal roots, are all studied by the latest best methods. This section is beautifully and exhaustively illustrated and a synthesis of the findings presented.

Finally the physiological pathology is reviewed in a comprehensive

and searching manner. A complete bibliography closes this most valuable and thoroughly sincere monograph.

In closing we congratulate the author upon this splendid piece of work, which will remain a mile-stone of progress in our exact knowledge of the results of total dorsal section of the spinal cord in the human being.

JELLIFFE

Christiansen, Viggo. LES TUMEURS DU CERVEAU. Masson et Cie., Paris.

Prof. Christiansen, of Copenhagen, has written this very delightful treatise, which, presented to the French reading public through a charming preface by Pierre Marie, appears at the same time a tribute to French neurology and a most valuable contribution to medicine.

It is particularly of interest as a borderland treatise between neurology and surgery, for the gifted Danish neurologist has collected from a large hospital and polyclinic material a rich treasure of observations on pure neurology and applied neurosurgery as well.

Early diagnosis, exact localization, operative possibilities, these are the keynotes in the formation of this volume. Tumors of the motor region, of the occipital lobes, base of the brain, of the hypophysis, the cerebellopontine angle—an especially interesting chapter—peduncular and cerebellar, these are the chapter headings, closing with a discussion of uncertain signs and a final chapter on surgical intervention. A tabular review of 21 cases of radical operation constitutes an appendix to this well worth while book.

Thomson, H. Campbell. DISEASES OF THE NERVOUS SYSTEM. Paul B. Hoeber, New York.

The third edition of this most excellent little book is to hand. While it belongs to the Quiz Compend group, it is so much superior to this type of examination pick-me-ups that it is worth special praise, even though it tends to perpetuate a type of neurology which has ceased to function except as a business enterprise.

Cohn, Toby. LEITFADEN DER ELEKTRODIAGNOSTIK UND ELEKTROTHERAPIE. S. Karger, Berlin.

This is the sixth edition of this one of the most comprehensive of this type of work. It is not a reprinting of previous editions. It is carefully revised and the newer researches on electrical forces included. We know of no better work in German at the present time.

Liepmann, W. PSYCHOLOGIE DER FRAU. Urban und Schwarzenberg, Vienna and Berlin.

In ten lectures, here gathered together in a big octavo of 300 pages, the author offers a contribution to a synthetic psychosexual understanding of the female. Inasmuch as the woman's movement has gained such headway throughout the world, he believes it important (high time) to gain a better insight into the psychological variations of man and woman.

The way is long—Heraclitus, he points out, grasped the immensity of trying to understand the deep pathways of the evolution of the human being—and he traces sketchily and interestingly a few historical fragments wherein are written down different attacks upon the problem. Biological mechanisms destined for carrying on life processes are then taken up, with a discussion of animal behavior in relationship to the reproductive instinct following. More complicated situations of the same nature in man are then discussed. Then follow chapters on prostitution and general deductions. The author's whole psychology is based on the general questionnaire method. He puts down as facts what people tell him. He has no notion whatever what an enormous amount of distortion of evidence surrounds the whole problem. It is an interesting but superficial book and just like all of the rest of the books upon the sexual instinct until Freud showed something deeper and more trustworthy.

Kraepelin, E. Arbeiten aus der Deutschen Forschungs, anstalt für Psychiatrie in München. II & III Band. Julius Springer, 1921.

This second volume of collected studies from Kraepelin's newly founded Research Institute for Psychiatry contains a large number of contributions showing that in spite of the hard times in Germany the Munich clinic is still active and doing good work. Volume III consists of a reprint of Spatz's work from the last volume of Alzheimer and Nissl's series, noted elsewhere.

Espejo, Luis D. El Lenguaje Normal y Patolójico. Sanmarti y Co., Lima.

In an extremely readable and well-developed argument the author traces the evolution of language through mimicry, gesture, musical intonation, rhythm, to its higher forms as elucidated by its major modifications in aphasia.

Space does not permit him to round out the entire account, nor us to speak of the many features of this admirable presentation.

Fredericq, L., et Nuel, J. P. Elements de Physiologie Humaine. Masson et Cie., Paris.

This is the seventh edition of a student's handbook of physiology. Whereas the neuropsychiatrist can find all of this material nearer at hand and in English, should he wish to read a very delightful physiology in French, he will find this one of the very best.

Adler, Alfred. Das Problem der Homosexualität. E. Reinhardt, Munich.

Adler's short study of 50 pages is a general reiteration of his doctrine of the ego effort for power. Man's cowardice and wish for power makes him fear the female. In life he conquers by being a despot and homosexual. While there are many striking features in this short study, it does not go deep enough into the infantile sexual factors to be a satisfactory hypothesis.

VOL. 55. FEBRUARY, 1922. No. 2.

The Journal

OF

Nervous and Mental Disease

An American Journal of Neurology and Psychiatry, Founded in 1874

ORIGINAL ARTICLES

OCCIPITAL LOBE EMBOLISM.

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Origin of Cerebral Emboli.

Particles can be swept into the brain by the arterial blood from any part of the effluent vessels of the lungs, from the heart, or the arteries leading from it to the brain. The emboli may be particles derived from diseased intima, vegetations from heart-valves, broken down atheromatous patches, detached bits of thrombus, parasites, or, finally, material injected into an artery by the erosion of an abscess or tumor through its wall. Cerebral emboli most frequently have their origin in the heart, being products of valvulitis or of thrombi formed when the circulation is slow. Less frequently they are produced by purulent involvement of the great arteries.

Bone-disease in the neighborhood of an arterial trunk presents conditions favorable for thrombosis and embolus-formation. The vertebral artery in passing through the costo-transverse foramina of the upper cervical vertebrae, and in winding around the articular process of the atlas, would be almost necessarily involved in even a small area of osteo-periostitis of that region. The walls of blood vessels resemble the dura mater in being resistant to invasion by tuberculous or purulent processes. Yet micro-organisms do find entrance by way of the lymphatics of the arterial walls and thus reach the intima, causing endarteritis with localized inflammatory accumulations, or massive stoppage of the vessel. Thus a nest is prepared

from which emboli easily take their origin. In the following case the cerebral embolism probably originated in that way.

Case 1.

Summary:—A left sided, deep inflammatory focus in the region of the upper cervical vertebrae, a traumatic disturbance of that region, immediate paresthesia and weakness in the two left limbs and sudden loss of vision in the fields subserved by the calcarine region of the left occipital cortex. Recovery of function in the lower quadrant field.

This patient, referred by Dr. Dwight Sloan of Nanking, and recently examined by me in consultation with Dr. Harvey J. Howard, was a young woman of 30 years, who in November, 1920, suffered pain and stiffness in the left side of the neck. She applied to an osteopath for relief on the twentieth of December. The bending and twisting operations of the first seance caused great pain in the neck, which was suddenly followed by nausea and dizziness. During the treatment the patient says her left arm felt a little numb and weak. Afterwards she vomited. The discomfort continued for the succeeding two days, but the osteopath nevertheless proceeded on the twenty-second of December to give an equally strenuous treatment. After twenty minutes the patient's left upper and lower extremities became numb ("pins and needles") and "felt asleep." The left upper limb in addition felt "weak and awkward when moved." The tingling ceased after a few minutes, but the numbness lasted several days; the weakness and awkwardness, two weeks. During this second seance the patient suddenly became conscious "of a dense black shadow obscuring every thing on the right side." An examination by Dr. Clapp, of Shanghai, on the tenth of January, showed that at that time complete right-sided hemianopsia existed. As a matter of osteopathic psychology it is interesting to note that the manipulations were continued until the thirtieth of January. At that time the patient says there persisted "a hard, tight, stiff feeling at the back of the neck on the left side up near the base of the skull, with the black curtain on the right half covering everything."

On March 2nd, Dr. Howard recorded:—"Fields for form, red, and green, taken, showing a right homonymous upper quadrant anopsia. There is in addition a contraction of the form-fields in all quadrants as compared with the field of average persons. The fundus is normal. Illumination of the blind halves of the retinae was followed by pupillary reaction."

My neurological examination, the 26th of March, showed:—Right homonymous upper quadrant anopsia. The scotoma, according to Dr. Howard's chart (Fig. 1), extends from the zero-point through

the upper quadrant down to a radius 105° from the zenith. Its border passes almost exactly through the center of the macular field. Seventy-five degrees of the lower right quadrant field have therefore recovered vision. There is a slight headache, but no other subjective disturbance. Minute examination of all qualities of objective sensation shows that there is no disturbance in the region supplied by the upper cervical nerves of either side. The limbs and trunk show normal perception of touch, pin-prick, heat, cold, vibration, and joint movements. There is no fault in her orientation or appreciation of distance, perspective, stereognosis, or of the significance of visual or auditory perceptions.

The muscular power in all regions is normal. All tendon reflexes are prompt, those of the lower limb being slightly more so than the corresponding reflexes of the right side. (The left knee-jerks were

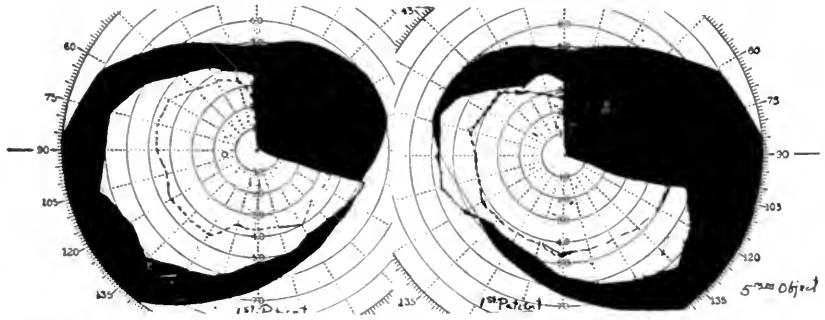

Fig. 1. Dr. Howard's field-chart of the first patient, March 2nd, showing 105° sector-anopsia and concentric restriction of vision.

reported by Dr. Sloan as more prompt than the right in January). There is no difference in the fatigibility of the limbs. The sphincters are normal; gait and station show no defect and there is no fault in the coordination of other voluntary or involuntary muscle-movements. The ciliospinal and vasomotor functions are undisturbed. Spinal puncture gave a normal fluid, without tubercle or other organisms, and giving a negative Wasserman reaction.

A physical examination by Dr. McLean showed that the tonsils and lungs were not diseased. The first heart sound at the apex was roughened; sounds at the base were clear; borders normal. The pulse was slow, blood pressure was 114/70. The kidneys, other abdominal organs and the blood-picture were normal.

Pressure upon the tip of the left first and second tranverse processes gave pain; and palpation in that region gave the impression of increased resistance in the soft tissues of the left suboccipital region

behind the mastoid process. Pressure upon the occipital scalp gave no sign of nerve-tenderness. Bending the neck to the right caused pain in the left suboccipital region. Rotation either way caused the same discomfort. Rocking the head anteroposteriorly did not cause pain nor did driving the vertebrae together by impact upon head or heels. The roentgen-ray report by Dr. Hodges was negative except for a slight deepening of the shadow of the peri-vertebral tissues ventral to and to the left of the atlas and axis. Her teeth were practically normal. A tuberculin test made by Dr. Korns with gradually increased doses of Koch's old tuberculin (0.1 up to 10mg.) at 48 hours intervals gave no reaction.

Case 2.

Summary:—Slight valvular heart disease, sudden dizziness, hemianopsia, visual paresthesia, tingling in extremities, some disorientation. Later, partial recovery of visual fields.

The second patient was a healthy man fifty years of age, who while riding horse-back was suddenly seized with dizziness, frontal

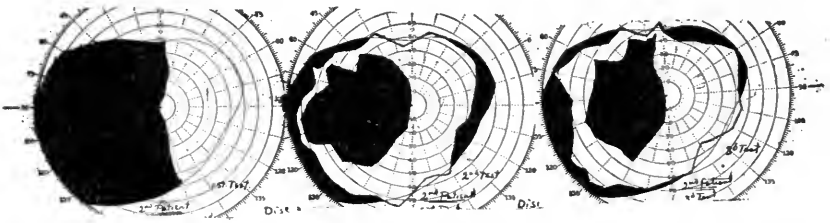

Fig. 2. Dr. Howard's first, second and third field-charts of the second patient, showing apparent invasion of the normal field at first examination, the amount of recovery in 11 days, and the concentric restriction of vision. (Only the chart of the left eye reproduced.)

pain, and a momentary tingling in the left fingers and toes. He felt as if a strong light were falling upon his eyes from above, and supposed his visored cap had blown off. There was an immediate left homonymous hemianopsia, complete at first, but on the eleventh day beginning to clear up in the peripheral zone and in thin sectors in both upper and lower quadrants near the vertical meridian. The scotoma extended to the fixation point (Fig. 2). Evidences of valvular heart disease were found on examination. Excepting the eye-condition noted above he was neurologically normal.

The patient immediately after the mishap dismounted, called a jinrickshaw and directed the coolie to take him home. Although the road was familiar he guided the man wrongly, but after some hesitation got him to the right road and reached home. He complained

while in the hospital of inability to think of his office and of rooms in his house because he could not "get the positions of the furniture straight." A month after his discharge he would on occasions find himself farther along the street than he intended to go. But from the first there was no flaw in his visual or his manual stereognostic discrimination. (This patient was also referred to me by Dr. Howard.)

Prognosis

The prognosis in cerebral embolism depends upon the immediate cerebral lesion, the nature of associated lesions of other parts, and the gravity of the condition out of which the embolism sprang. For these patients it is guardedly favorable so far as farther damage to the cortex is concerned. If an embolus contains tubercle bacilli, trouble may follow, since solitary or massed tuberculous nodules in nervous tissue develop from infected particles carried by the blood. In both patients, however, the inflammatory processes were probably pyogenic.

Tuberculous spondylitis in the neck is fortunately rare. Buzzard says that the involvement of the atlas or axis is tuberculous in one per cent of all cervical cases. In a fatal case recently reported by Rumke the patient had presented signs only of occipital neuralgia with negative X-ray findings. Death followed suddenly. The autopsy showed tuberculous osteitis of the upper vertebrae.

Traumatic cervical spondylitis, with or without invasion by pus or other bacteria, is relatively frequent; and spondylitis from whatever cause is much more dangerous when it occurs in the neck than when found lower down because of the danger of dislocation or of involvement of the respiratory and vaso-motor centers, or, by upward extension, of the medulla-oblongata. But fortunately in many of these patients, whether the infection is due to tubercle or other bacteria, recovery occurs, often rapidly, even when all the symptoms are grave. Buzzard was "impressed with the power of recovery exhibited by some cervical cases, especially in young people," and adds, "there is no disease of the [spinal] cord in which symptoms of equal gravity so often pass away."

The Route of an Embolus.

Since more cerebral emboli lodge in the left than in the right cerebral hemisphere the commonest route is probably through the left internal carotid artery. Emboli found in the posterior cerebral distribution may conceivably have arrived either through the carotids or the vertebrals, for it is probable that with the typical arrange-

ment of the circle of Willis the current through the posterior communicating arteries is sometimes forward, sometimes backward, depending upon the varying demands for blood in the anteriod and the posterior parts of the hemispheres. A single case with the source of the embolus along the carotid artery and showing an embolic lesion in the occipital lobe, would give direct evidence upon this point. But I have found no pertinent case in the literature. Stengel states that emboli may travel back from the carotid to the posterior cerebral artery, but cites no cases.

Simultaneous Sensory and Motor Long Tract Disturbances.

At the time of onset there appeared in the first patient, (1) weakness and awkwardness of the left upper extremity which persisted for two weeks after the traumatism; (2) tingling and numbness in the left upper and lower extremities, but not in the face, immediately after the violent wrench. The tingling disappeared after a few minutes, but the numbness lasted several days. These motor and sensory symptoms were on the same side (left) as the inflammatory lesion in the neck, and were, therefore, due to local disturbance of the left spinal tracts, since there is no reason to suppose that trouble had occurred on the right side above the decussations.

The immediate mechanism of the track irritation may have been through disturbance of the local blood-supply of the cervical cord or through merely mechanical action. The particular sensory bundle irritated was probably the dorsal tract, since involvement of the spino-thalamic tract at the level would have given paresthesia referred to the opposite limbs. The awkwardness and weakness of the left upper extremity with increased tendon-jerks points to disturbance of the left pyramidal tracts.

In the second patient simultaneously with an embolic lesion of the right visual cortex there occurred tingling in the left limbs. In a case of right occipital lobe involvement recorded by Beevor and Collier paresthetic phenomena similar to those in our patients had occurred in the left arm for several months before the arterial occlusion. Their patient was arterio-sclerotic, and the pulvinar of the right thalamus was found at necropsy to be affected as well as the right visual cortex. In this man as in our second patient the seat of the disturbance responsible for the paresthesia was presumably in the upper sensory tracts in the right thalamic region, which also are supplied by the posterior cerebral artery.

The cortical phenomena exhibited by these patients raise several questions regarding the topography of the visual area in the occipital lobe.

ARE THERE BILATERAL CORTICAL CONNECTIONS FOR EACH MACULA?

The line of separation between the dark and the bright fields in each patient ran through the macula, which was therefore divided like the other parts of the retina into a blind and a seeing side. The undamaged visual cortex of the other hemisphere did not provide functioning connections for the hemi-maculae of the hemianopic fields. Gowers and others supposed that such bilateral innervation obtained. Dr. Howard's charts accord with the contrary conclusions, i. e., that the right half of each macula sends its fibers only to the right occipital cortex; the left half, only to the left occipital cortex.

RELATED AREAS OF RETINA AND VISUAL CORTEX.

One of the earliest case-reports that shows which retinal and cortical areas are functionally related was that of Beevor and Col-

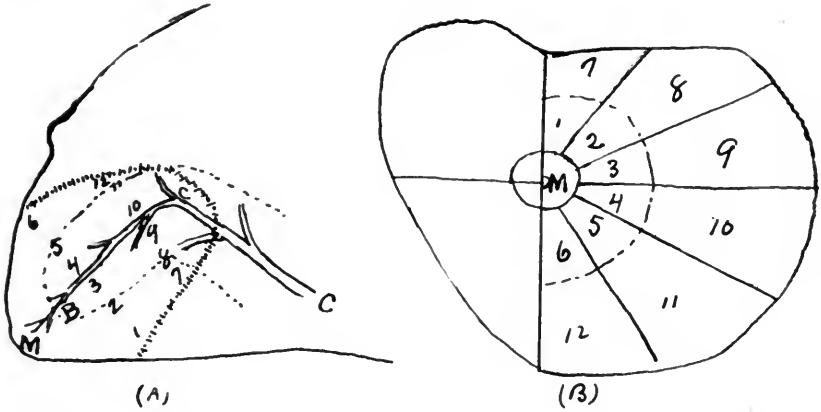

Fig. 3

(A) M, at occipital pole, area of macular representation.
C C B, depth of calcarine and post-calcarine fissures, containing arteries.
- - - - - - Represents superficial edges of same. Fissures here drawn as if stretched out into one plane.
|-|-|-|-| Represents borders of area-striata, left hemisphere.
(Diagram made from a dissection after gelatine injection.)

(B) *Right visual field.* The numerals indicate the parts of the field that are obliterated when the areas of the occipital cortex correspondingly numbered are destroyed. According to Holmes' topography.

lier (1904), referred to above, whose patient, a workman 55 years old, had formication and numbness in his left hand, arm, and face during twenty months before a left upper quadrant anopsia developed. From time to time after that up to his death attacks of unconsciousness preceded by queer behavior occurred. Necropsy

showed as the chief lesion occlusion of the right posterior calcarine artery with resulting necrosis of the lower half of the right visual cortex including a small part of the lower cuneal area. The whole infolded cortex of the posterior calcarine fissure was destroyed. In this case loss of function of the lower right quadrant of each retina was associated with necrosis of the lower half of the right visual cortex.

These findings supported Monakow's teaching (1892) that the upper half of each visual area functions with the upper half of the appropriate retinal areas, the lower half with lower retinal areas. Monakow, however, thought the macula might be represented not by one circumscribed cortical area but by cells scattered over the whole visual cortex.

Gordon Holmes in 1918 sought to define precisely the reciprocally related areas of the retina and the cortex. The numerals superimposed upon the diagram (Fig. 3) indicate at a glance the general areas of the cortex and retina thought by Holmes to be mutually associated.

Partial Recovery of Function.

The insufficiency of the collateral connections of the terminal cortical arterioles makes infarction almost inevitable when arterial stoppage occurs at any point. Yet the existence of even a slight collateral blood-supply explains the partial recovery of function by some of the affected cells, particularly in areas lying at the periphery of the visual area. The revitalized area in our first patient is that marked 5, 6, 11, 12, and the parts of *M* lying adjacent to 5 and 6 (cf. Figs. 1 and 3 all of which lie near the field of another artery. In the second case parts of the corresponding right cortical areas marked 7, 8, 9, 10, 11, and 12, (Figs. 2 and 3), recovered function progressively for eleven days, after which little additional improvement occurred. Here the anterior part of the visual area at first must have been deprived of blood but afterward regained circulation, possibly through the shrinkage or forward movement of the thrombus beyond the points of origin of the branches that nourish those areas.

Recovery of function may occur for other reasons. In traumatic cases it may be that concussion depresses the function of some cerebral cells in the zone immediately surrounding the destroyed area, and that such function is later regained. The transitory functional depression seen in fatigue and in hysteria may be found in traumatic or embolic cases in the area surrounding the traumatized region; for upon any traumatic affection of the nervous system a functional ele-

ment is easily superimposed. The peripheral concentric loss in both of these patients may prove to be transitory and subject to this explanation. Intermittent closure of an artery is another cause assigned by some writers for recurrent loss and resumption of function in the organs which it supplies. If the cause assigned be an intermittent vaso-constriction through the vaso-motor mechanism, such an assumption calls for further confirmation; but intermittent pressure upon blood vessels due to inflammatory processes or tumors appear to be a credible explanation. In Stieren's patent an evanescent restriction of the visual fields is said to have been due to intermittent pressure upon the (posterior cerebral?) artery by a hypophyseal tumor.

The apparent extension of the hemiopic scotoma of the second patient across the meridian at the time of the first examination is hard to explain unless it was due to the tendency of such patients to rotate the eyes conjugately toward the visible field. An image attracting attention, yet indistinctly perceived by the cortical cells, tends to draw the eyes toward it so as to bring it into distinct vision. This phenomenon may be due to a reflex actuated within the visual cortex and mediated by efferent fibers extending from the occipital lobe to the mid-brain centers for conjugate movements. But, however produced, the tendency seems to exist, and shows itself in patients untrained in perimetric examinations by a shifting of the eyes toward objects dimly seen in the visible field, thus apparently bringing the border of the scotoma across the meridian. As the test object approaches the macular field vision is clearer and the tendency is more easily overcome, so that the line curves back at the fixation point.

The slight disturbance of visual orientation in the second patient was probably due to ischemia of the convex surface of the occipital lobe. But even though a considerable part of the convex surface of the right occipito-parietal lobe be destroyed, the disturbance of judgments based upon perceptions mediated by the area striata is slight and transitory, because of the more specialized part played by the left hemisphere in such judgments.

It is probable, then, that in the first patient an embolus lodged in the artery supplying the lower half of the area striata. In the second patient the stoppage was in the main stem of the posterior cerebral artery, the first shock disturbing both the medial and the convex surfaces of the occipital lobe, and the post-thalamic sensory tracts. The residual necrosis here was of the posterior half of two-thirds of the visual area.

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THE LOSS OF THREE GERMAN INVESTIGATORS, ALZHEIMER, BRODMANN, NISSL.

By Professor Emil Kraepelin[1]
of Munich.

The mention of the names of Alzheimer, Brodmann and Nissl brings before us with a deep sense of pain the great loss which the last years have brought to our specialty. Three most highy gifted investigators have gone from us, each one in his way irreplaceable, all three pioneers in the field of work most important for our further knowledge, that which should make clear to us the somatic groundwork for mental disturbances. The scientific life work of these men is a glorious page in German science the like of which no other people can set in comparison with it. It was Nissl, the greatest of the three, who, working comprehensively and constructively and with steadfast aim, established the premises for a pathological anatomy of the brain cortex and endeavored to search out with all the aids of scientific technic the structural plan and the meaning of the most highly developed tissue of the body. Alzheimer, his most loyal pupil and fellow worker, toiled indefatigably with never failing patience and self sacrifice to establish, through an endless number of individual investigations, the cortical changes corresponding to the different forms of mental disturbance. He sought in this way to make possible to the clinician in our territory that testing of his hypotheses which has shown itself everywhere in medicine as the most powerful lever of progress. Brodmann had set himself the task of discovering the cell division in the cortex and so prepared the soil for that future work which should inform us concerning the localized extension of the disease processes in the cortex and also the significance of the individual tissue areas attacked by them.

I cannot undertake to enter into detail in regard to the marvellous achievements of our departed colleagues.* What lies upon my heart is to show emphatically how unfavorable the conditions have been under which those investigators must have had to work. Whoever knows the course of their life will think with deep sorrow what

[1] Translated by Louise Brink, A.B., by permission from Münch. med. Woch.

[* See among others Spielmeyer: Zeitschr. f. d. ges. Neurologie u. Psychiatrie XXXIII, 1 (Alzheimer); Lewandowsky ebenda XXX, 319. (Alzheimer); Vogt: Journal f. Psychologie u. Neurologie XXIV, 5 and 6 (Brodmann); Nissl: Zeitschr. f. d. ges. Neurologie u. Psychologie XLV, 5 Brodmann; Kraepelin. Münch med. Wochensch. 1919, 1058 (Nissl).].

irreparable values have been lost with them and with what difficulties they had to struggle in their labor to make available for the great problems of our science the powers which were working creatively in them.

Alzheimer's scientific career began in the year 1889, after all sorts of fundamental preparations, when he met Nissl in Frankfurt. He was bound to him from that time on, not only in the most zealous work together toward common ends but by a close personal friendship. We may rejoice in that fate which brought together at that time these two men who seemed to be destined to open for us the way to knowledge of the physical foundations of mental disturbance. It was moreover a particularly fortunate circumstance that they found in Weigert a sympathetic adviser and in Sioli an institutional head who gave support to their scientific efforts. It must not be forgotten, however, that both investigators were naturally institutional physicians of the first rank, that they bore upon their shoulders exceedingly strenuous and responsible medical duties and that they could go to their scientific tasks only after discharging the duties which were theirs. A fair estimate of the value of their incomparable achievements can be made only when one intimately realizes these conditions. It is hardly necessary to explain that under such conditions not only was it necessary to give up the pleasures of life but that very often they played havoc with health and the power for work.

In the year 1895 the exceedingly close and fruitful fellowship in their work came to a temporary termination because of Nissl's removal to Heidelberg. Alzheimer had to take over now more than ever the burden of the superintending physician's busy life and the management of the institution, because of the work of organization, very often claimed his attention. He succeeded, however, through his great power for work and his determined industry in accomplishing the gigantic and fruitful task of an exact research of a large number of brain cortices. It was meanwhile not to be mistaken that an exceptional ability was interfered with most sensitively in its development through the relentless work of every day.

Alzheimer had meanwhile become scientifically independent, a fortunate circumstance, so that he would naturally have had to find the way to academic paths. With the assiduity characteristic of him he could not attach himself long to these but considered much more strongly entry upon the position of institutional head, although I earnestly advised him against this. It was a great good fortune for him that this enterprise fell through. Through this failure he was

accessible to my entreaties that he come to Heidelberg. He came to us to our very great joy in the autumn of 1902 and our hopes revived that we might reap rich fruits from the work together of the two friends who were now free from all pressing responsibilities.

My call to leave Heidelberg in the fall of 1903 put an end to this hope before Alzheimer had yet been able to be received. He now went with me to Munich, where I thought I could create a larger working circle for both investigators. Nissl, however, was soon called to the chair at Heidelberg, so that to Alzheimer alone fell the task of putting in order the beautiful anatomical laboratories of the Munich clinic and filling them with life. It remains in the memory of us all with what devotion and with what brilliant results he performed the task. Here at last his scientific personality could develop freely. It can be readily understood, therefore, that within a short time the laboratories were filled with more or less able students from all leading countries and that a long series of valuable works was produced under his unwearied direction and inspiration. In spite of this wide activity in teaching he still found time to promote vigorously his own fundamental researches to bring to a conclusion his great work upon paresis, and besides many individual researches, gradually to bring together the material for a comprehensive presentation of the pathological anatomy of the mental disturbances. Besides this he was especially occupied with a study of the decomposition processes in the cortical tissue, also the important question of the anatomical groundwork in idiocy, particularly the retardation in development. For this work he had brought together a rich collection of brains.

His new position, of course, was not entirely free from hindrances. In the first place, the clinic afforded only very modest material compared to the greatness of the tasks which Alzheimer had set himself. It throws a bright light upon the personality of this distinguished man that he made the greatest sacrifices with a serene independence in order to pursue his scientific ends. Not only did he renounce every reward for his work but he defrayed also the far greater part of the expenses of the carrying on of the work from his own means, the preparation of drawings and photographs, the fees for technical apparatus, for the objects which came to him from the most varied sources. In spite of all this, he never thought of limiting his activity in the carrying forward of the anatomical work. He gave me his most unselfish support, with the unshakable loyalty and trustworthiness which distinguished him, in the difficult early organization of the clinic and, later, also in the allaying of the friction

that would arise here and there within the work and in the watchfulness which he maintained over the medical service. The implicit confidence which was manifested to him from all sides and his quiet objective manner were of the greatest help in smoothing out affairs and setting aside difficulties so that imperceptibly he came to be the sure support of the activities of the entire clinic. He became quite indispensable after Gaupp was called elsewhere and so in time he was prevailed upon to take over also the office of head physician. He suffered so, however, under this burden that I had to yield to his importunity to as soon as possible to remove it from him.

Alzheimer threw his whole soul into his work and could not be diverted from it. Without doubt his health suffered from this. He succeeded in wresting time for a short walk through the streets in the late evening hours at my pressing remonstrance, otherwise he scarcely knew any recreation. It was as good as impossible to move him to a longer holiday; after a short period he returned because this or that work must not be retarded. He always found excuses to crowd out relaxation. Not until his last years did he secure himself a country home, which afforded him the welcome opportunity to work in the garden and to pursue his botanical tastes. I was also able to entice him occasionally to a mountain trip. This was difficult for him because he thought he had no time for bodily exercise.

In 1912 he was called to Breslau. This was a great gratification to him, because in spite of the consciousness of his inner worth he suffered from the fact that his position did not truly correspond to what he stood for. I was sorry to see him depart. Much as I rejoiced at the deserved recognition which lay for Alzheimer in his call, yet I was assured that the high point of his scientific attainments was passed. I pointed out to him at his departure, that some day he would look upon the time spent in Munich as the happiest of his life. I do not know whether the latter came to pass, but that the former was correct has alas shown itself all too soon.

On his removal to Breslau, Alzheimer became ill with a severe infection which involved his kidneys and affected his heart, which already was weakened in resistance. He gradually recovered and began to take up now with his customary devotion to duty the manifold and heavy burdens of his new position. Alzheimer did not understand how coolly to thrust away pressing demands when he considered them justified. In 1909 the plan for a new psychiatrical journal came up and I had to put the question to him whether he might perhaps be ready to take upon himself a share in its direction. I was surprised by his immediate acquiescence. When the affair

seemed a necessary one he did not hesitate to put at its disposal a considerable share of his working time, otherwise arranged with such care and to such advantage.

Thus in his illness he had no mercy upon himself, although he was suffering severely, as for example when the conditions of the war forced him to an ever greater strain upon his already failing strength. He sacrificed his health without consideration up to the last of his powers until on the 19th of December, 1915, at the age of 51, this man who seemed of such unusual vigor, succumbed to this insidious disease, a few years after he had attained the goal of his wishes. The great comprehensive work upon the pathological anatomy of the mental diseases, which should have crowned his life work, was not to be accomplished. The preliminary work was so far advanced when Alzheimer left Munich that we believed ourselves justified in expecting the speedy conclusion. Only a few items were found after his death in regard to the final completed work. Everything else was lost with him.

A few years later we had to mourn the unexpected and premature death of Brodmann. His life also was an unbroken chain of the most energetic labors. These began, after a period of preparation in medical practice and service as physician in mental disease, with his inspiration to brain anatomy first through Oskar Vogt and then in the year 1900 with Alzheimer in Frankfurt. There followed ten years of hard work at the Neurobiological Institute under Oskar Vogt, where he worked with abundant material. Here he was occupied chiefly with research into the cellular structure of the brain cortex. Now he could give his entire strength to his great life task. Though this did not exclude his devoting himself also to some individual researches in the field of experimental psychology. He therefore obtained a mastery in the delimiting of the individual cortical fields which enabled him to pursue the path of the solution of that most difficult question, the relationship between the structural plan of the brain tissue and psychic functions.

It is easy to understand that a man of the self forgetful spirit of Brodmann would be possessed little by little of the idea to seek to try his powers in academic pathways. This path was closed to him in Berlin, so in 1911 at the age of 43 he moved to Tübingen, where with Gaupp's support he attained his goal. Unfortunately the Tübingen clinic, too, could offer him but a very modest position. There very naturally fell to him there a share of the medical service so that he could devote only half his strength to the scientific work for which he was so exceptionally capable and so well equipped. Nissl,

it is true, furnished him with a certain sum, through the Heidelberg Academy, which enabled him to carry forward his costly researches, but it could not be hidden from himself as well as his friends that the duties of his position seriously hindered him in the pursuit of his broadly prescribed goal. His distressing domestic situation also, which cut off every prospect of attaining complete independence and of establishing a family, oppressed him at the same time that he had to recognize that in spite of his self sacrificing industry and his important achievements he must remain behind many of his fellow workers, who without any effort had availed themselves of comfortable positions in life.

The cail in 1916 to the office of assistant professor of anatomy at the institution in Nietleben, came to him as a salvation. Now at last, almost 48 years old, he succeeded to fairly satisfactory domestic conditions, which permitted him to marry. At the same time he was released from the duties of medical practice and might give himself entirely to his research work, which began to assume more and more fruitful prospects through the bringing together comparatively of anatomical viewpoints, and investigations. He welcomed this change in his fortune with touching gratitude.

It was such feelings that made his decision difficult for him when two years later the call came to him to the German Institute of Research. It seemed to him like deserting the colors to leave so soon again the position which had created for him such kindly relationships. Only the quieting reassurances of all concerned were able to dispel these thoughts. So at the beginning of April, 1918, he entered Munich with a joyous heart to find here a field of activity which afforded him in still greater measure complete freedom for research together with abundant material. Within a few days he had arranged his laboratory and set up his collections of material. He went to his work with youthful enthusiasm undertaking the preparation of far-reaching researches, which should turn to account his rich knowledge and ability in psychiatry.

It was perfectly evident from the first that Brodmann's services must be obtained for the German Research Institute. The results of his efforts lay first more in the territory of comparative anatomy, individual and racial anatomy of the cortex. Still these showed the direction in which pathological anatomy of insanity must later be developed. When it has been accomplished that the changes produced through a definite disease process are pointed out trustworthily and from all sides, then the extension of these into the brain can be established, the number and kind of cortical territories invaded. There is no way to this goal except through the cyto—and myelo-

architectonic study of the cortical structure instigated by Vogt and Brodmann. Brodmann's work, together with Nissl and Spielmeyer, seemed, therefore, the most important advance in knowledge of the way in which the different disease processes have spread and it seems to promise the opening up of revelations in regard to the connection between cortical changes and disease phenomena. The relations of these investigators, who for a long time had stood close in thought and feeling, were already in these first months of daily intercourse exceptionally satisfactory, so that we confidently looked forward to the further development of this cooperation.

So much the more terribly the blow struck us which suddenly shattered all our hopes. Brodmann died on the 22d of August, 1918, just 50 years old, a few months after he had attained his lifelong wish to be able to devote himself freely to his science. His death was the result of a severe sepsis associated with influenza, which apparently was combined with a toxic infection contracted at an autopsy the year before. The wealth of material in experience and scientific hypothesis, of which up till this time Brodmann had not been able to avail himself, was thus lost forever. There was no one who could take his place. It is very uncertain whether or when another will be found who will tread the toilsome paths which Brodmann followed with the same ability and perseverance. What he had accomplished is of course not lost, but incomparably more could he have given us if it had been permitted him to wish for one or two decades more, devoting his full powers to his great work to which his life had been consecrated.

One year later Nissl left us. He had succeeded in his student days in discovering that staining method which made possible the knowledge of the finer structure of the nerve cells and their pathologic changes. Gudden recognized at that time the exceptional gifts of the young physician and brought him into close relationship with himself. There in the institutional circle at Munich, Nissl found time with his exhausting institutional service to become familiar with the fundamentals of Gudden's degeneration methods, to support his theory by endless hard work and at last to go his own ways, by which he strove to understand the physical basis of insanity. We find him again, a few years after Gudden's tragic death, as head physician in Frankfurt. Here he found an enthusiastic fellow worker in Alzheimer. The extensive and responsible management of the asylum at Frankfurt, which he undertook making at the same time thoroughgoing changes, made the greatest demands upon the powers of the small staff of physicians. It seems almost incredible

under these circumstances what an enormous amount of research work was carried out at this time by the two friends. This was possible only because literally the greater part of the night after the strenuous service of the day was devoted to science, a custom from which Nissl later found great difficulty in breaking off when his position in Heidelberg permitted him greater freedom of movement. There is no doubt, however much we may admire Nissl's self forgetful devotion to his life work, that this persistent disregard of his physical needs left its traces upon him.

Nissl left Frankfurt for Heidelberg in 1895. He gave up his assured position for greater freedom in academic circles for his scientific work. We could offer him at that time only the most modest living conditions and I could not at once release Nissl entirely from medical service, to which he, however, willingly surrendered himself. He felt himself, however, essentially liberated and carried out at once his marvelous researches upon the influence of " the subacute maximal intoxication " upon the nerve cells. He also completed his book on the neuron theory and devoted himself with greatest zeal to the study of pathological cortical pictures, particularly in paralysis and lues of the brain, and further to the employment of the revelation of conditions through lumbar puncture. He was supported in these branches of the work by a series of pupils who little by little sought instruction in the small clinical laboratories.

My call to Munich and Bonhöffer's removal to Breslau soon after resulted in Nissl's appointment in 1904, as professor in ordinary of psychiatry in Heidelberg. My plan to take him with me to Munich was thus shattered. I must acknowledge it would have been doubtful if I could have realized it satisfactorily at that time. The new position burdened Nissl with many duties, the fulfillment of which fell upon him with especial weight because of his conscientiousness and carefulness. The conducting of the clinic, the medical service, the instruction, the examinations and meetings, as well as the unavoidable practise absorbed his time and strength out of all proportion, so that here again only scanty leisure hours were left for scientific work. He succeeded, however, in the course of the year in spite of all hindrances in completing his pioneer researches in regard to the condition of the brain cortex detached from its connections and in taking up the investigation of the relationship of dependence between the different cortical areas and the thalamic nuclei. Naturally all these important tasks proceeded slowly in constant conflict with the excess of duties.

A further undertaking, by which Nissl sought to approach his final goal, the anatomical study of disease processes, was the bringing together of individual cases studied carefully, clinically and anatomically, which he had begun. These thus gradually created was to be a material for observation corresponding to all scientific demands, which should permit the discovery of sure relationship between clinical pictures and definite cortical changes. The very first observations, here presented, showed how valuable for the furthering of our science this form of study could become in Nissl's hand.

Any one who knew Nissl well could not fail to notice that a change gradually took place in him in the course of the last ten years. The powerful ardor of his nature seemed dampened; he had grown less robust and could not longer push his work forward with his earlier disregard of self. An insidious kidney disease, which he tried to combat by a winter in Egypt, warned him to have some regard for his strength. His health was in danger and the possibility had to be considered that his knowledge and ability, which could not be replaced, the entire wealth of his scientific schemes and thoughts might some day be irrecoverably lost. It seemed therefore as a most pressing concern of the German Institute for Psychiatric Research, to arrange for a worker like Nissl freedom from the burden of office and so unhindered freedom for productive activity as long as his health still permitted this.

Nissl without long delay seized the opportunity given him in spite of the no small sacrifice which the giving up of his position laid upon him. In April, 1918, he came to Munich and entered at once upon a busy activity partly in a lively exchange of views with Spielmeyer and Brodmann, partly in preparation of a larger work upon his researches in the optic thalamus. He smilingly repulsed the often repeated suggestion that he should now and then permit himself some recreation with the remark, that now all his days were holidays. All sorts of plans stirred him, which he wanted to take hold of after he had completed his work on the thalamus. These were the study of the brain changes in dementia praecox and further the experimental proofs of the attempt to delimit the cortical areas on the ground of the anatomical structure. Here his work would have joined that of Brodmann.

Fate decreed otherwise. On the 11th of August, 1919, Nissl succumbed to his old disease before he had brought to conclusion even his work on the thalamic nuclei. Our loss in him cannot be measured. It is not alone that Nissl possessed an enormous treasure of knowledge and experience as a result of his unwearied industry,

which gave him in his field an exceptional sureness of judgment. He possessed also a severity of self criticism which kept him almost entirely from mistakes and hasty conclusions. It was his superiority over all his fellow workers striving in the same direction and lent a decisive weight to the opinions he expressed. Nissl was besides a master of technic and his was a head uncommonly full of ideas, although he never permitted his secret hopes and expectations to influence his rational appraisal of actual facts. Thus all the gifts which distinguish a student of natural science were united in him; he was born to this calling.

This survey of the here briefly indicated fate of these three distinguished men, whose loss we have to mourn, brings this affecting fact forcibly to us, that our science has only remotely obtained that result from their powers which could have been reached under more favorable conditions. And no matter how rich their life work has been, it was yet most seriously impaired through the circumstance that they were grievously hindered in the free exercise of their peculiar gifts. This was because for many years or decades at the height of their ability to accomplish great things they were burdened with other affairs. The path assigned to the mental physician is such that his professional service demands his best powers and the scientific work can be undertaken at the best only as a side issue and with the sacrifice of the hours of recreation. Entrance into the academic circle makes little difference. Whoever considers becoming a professor of psychiatry in Germany has in every case no time to enter more deeply into auxiliary sciences. His work at the sick bed must remain his chief concern. If, however, he has attained his goal, yet beside this instruction, examinations, administration and always practise as well, put such high demands upon him that the possibility of creative scientific work more and more fades away.

Our three investigators were able only under the greatest personal sacrifices to traverse those paths into which their talents forced them. The best that they had to give us they could wrest for themselves only in continuous struggle with the conditions which demanded from them quite different achievements, those which did not accord with their peculiar gifts. It was a *waste of valuable working force* that Alzheimer and Nissl had to earn their bread for long, long years as physicians in asylums, yes, even that they became professors of psychiatry because in this way their gifts in largest part were made fallow. The same might be said of the fact that Brodmann was compelled to devote a great part of his time in a

poorly paid position to the discharge of duties which many others could have attended to as well or even better.

The way we should enter upon to avoid such loss is clearly marked out. It should no longer be left to the rare talent for research which grants us its kindly skill, to seek in some way or other for itself opportunity for activity with unspeakable trouble and conflict but we must create the conditions for it under which it can grow and fully unfold its powers. The only way to do this is by the establishment of life positions which guarantee freedom and sufficient aid for scientific work. It goes without saying that not every clinic or insane asylum can offer satisfactory conditions to an entire staff of research workers. The suitable persons for placing in such positions would very soon be wanting also. The large schools and communities might well strive, however, to procure little by little, here and there for an exceptional investigator proper means for existence and for work. In this way a division of work would be well brought about in such fashion that in our place this, in another that aid to psychiatry would be especially provided. We can see the beginning of such a development in the position of anatomist founded by Pfeiffer for Nietleben and also in the model arrangements of the Hamburg institute, where beside an anatomist a serologist is also working. Similar positions can be found elsewhere only mostly far too poorly equipped.

The richest result naturally is promised always by the association of a line of distinguished scientific personalities in one institute for research. It is just the daily close intercourse and the mutual working over of the same questions from different points of view which will first make possible the highest use of the forces at hand. It was unfortunate that Brodmann and Nissl succeeded in obtaining such favorable conditions only shortly before their end. It is clear to any one with any penetration what advantage it would have been for our specialty if both workers had been put into the position ten or fifteen years earlier in complete freedom to have devoted their full power to reaching their high goal. We should all be united in striving to be careful that hereafter no truly exceptional talents in our field need be allowed to waste themselves in the duties of the day, but as soon as they have proved themselves to exist, should find a place which would afford them the highest use of their powers.

The unfortunate outcome of the World War has most seriously interfered with the development of such plans. Our people have become poor and in no condition to make further sacrifices. We must take into consideration that the German Research Institute

also is hindered in its development and cannot fulfill the fair hopes which we entertained when it was founded. It is plain in the meantime that we must not at any price lose the impetus in scientific work which German intellect and German industry has won. Here lies still one of the strongest sources of our power. In psychiatry, too, the founding of the first institute for research amid the storms of the World War can assure us that Germany will be able to preserve the place which she had won for herself in the scientific world. It will, of course, be necessary that the work of all those in our profession be brought together. Such an institution can flourish only when it is upheld by the inner participation and the practical support of the widest circle. May the fate of the three workers who have gone from us be thus a reminder to every German mental physician to work toward this end through his own fellowship in work and through zealous research. Thus the first great attempt to open up free paths for psychiatric research may be saved for a better future as a worthy testimonial to German science out of the sorest period in the history of Germany.

Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY.

The Three Hundred and Ninety-second Regular Meeting was Held at the New York Academy of Medicine on Tuesday, December 6th, 1921, at 8:30 P. M.

Dr. Foster Kennedy of New York, in the Chair.

Syndrome of the Retroparotid Space with Special Reference to a New Interpretation of some forms of Facial Paralysis (Presentation of a Case). Dr. Byron Stookey.

[Authors's Abstract].

Dr. Stookey presented a patient showing a pure syndrome of the retroparotid space as described by Villaret (1916). Though the injury was sixteen years ago, complete paralysis of the glossopharyngeal, vagus, spinal accessory, hypoglossal and cervical sympathetic nerves still remained with ptosis of the eyelid on the same side, miosis, narrowing of the palpebral fissure, enophthalmos, loss of taste dorsal third of tongue with difficulty in swallowing and eating, paralysis and atrophy of the tongue and weakness in elevation of the arm due to paralysis of the trapezius. Attention was called to the development of the clavicular portion of the pectoralis major and the clavicular head of the deltoid, both of which stood out prominently on elevation of the arm beyond one hundred and fifteen degrees. These two muscles thus compensate for the loss of rotation of the scapula in elevation of the arm.

Oblique withdrawal of the dorsal wall of the pharynx toward the sound side— movement de rideau of Vernet — was demonstrated, but Dr. Stookey did not feel that in this patient this sign could be taken as a sign of glossopharyngeal paralysis in view of the other nerves involved. Vernet's view that the vagus is a purely sensory nerve was denied in view of the histological character of the dorsal motor nucleus of the vagus and the nucleus ambiguus as shown by finer histological studies of the nuclei of the vagus following section of the vagus. Its efferent character, as well as efferent, was emphasized. In Dr. Stookey's patient a slight facial weakness at rest was noted, though the facial nerve was intact and there was no weakness in voluntary movements. There seemed to be rather a loss of tone. In view of the fact that striate musculature possess a dual efferent innervation, this loss of tone, it was felt, might be due to loss of the

efferent sympathetic fibers to the facial musculature because of injury to the superior cervial sympathetic ganglion.

Discussion: Dr. Smith Ely Jelliffe said he was delighted to hear Dr. Stookey bring forward one of the points he had tried to raise at the last meeting, in the discussion of myasthenia gravis, namely, the sympathetic innervation of the musculature in the myasthenic reaction. He said he thought that Dr. Stookey has been a little over careful in advancing his hypothesis of double innervation, and that he has stuck rather too closely to the anatomical evidence alone. It has been known for many years that the richness of emotional expression is greater in the facial musculature than in that of any other part of the body. It seems that the splanchnic remnants are over-represented in the facial group.

Dr. I. Abrahamson said he thought the dual innervation might account for the frequency of contractures after facial palsy. This occurs more often than with any other cranial nerves. While explanations of contractures have been many and varied, none of them seem to fully account for the phenomena. A second corollary is the occurrence of the facial hypotonia seen in tabes, causing sagging of the features. It is known that the cervical sympathetic is often attacked in tabes. Facial contracture can be regarded as a tonic spasm, on account of the loss of normal equilibrium between the clonic and the tonic parts of the musculature.

Dr. Foster Kennedy said that he was surprised that Dr. Stookey laid such emphasis on the comparatively recent recognition of the syndrome as an entity, which surely preceded the date that Dr. Stookey gave. Was not this condition diagnosed by many of the members as early as 1915? He recalled a case in the Neurological Institute in 1910, in which luetic involvement of the skull gave evidence of a lesion clearly recognizable as that described by Dr. Stookey. In the war, too, cases were noted with frequency. The sign of glosso-pharyngeal paralysis by deviation of the uvula has been recognized since 1907. He hoped it was not an impropriety to refer Dr. Stookey to a paper by Maloney and Kennedy, in 1912, on pressure signs in the face.

Dr. Byron Stookey, in closing, said he would add nothing to the evidence in regard to the spheno-palatine. It is supposed that the supply of the parotid through the ninth nerve is from the *nucleus salivarius* to the otic ganglion and thence by the auriculo-temporal nerve. The preganglionic fibres are from the ninth nerve, and the postganglionic fibres from the otic ganglion through the auriculo-temporal to the parotid.

In answer to Dr. Kennedy, there is no reference earlier than Villaret in 1916, to the retro-parotid space as a locus of *extra-cranial* injury of those nerves. The syndrome of Hughlings-Jackson is not extra-cranial. Tapia and Schmidt refer to lesions involving the nucleus ambiguus, but these are intra-, no extra-cranial injuries. Did Dr. Kennedy's case involve the cervical

sympathetics? Dr. Kennedy has referred to deviation of the uvula, but this is, of course, totally different to deviation of the posterior wall of the pharynx due to paralysis of the superior constrictor muscle. In paralysis of this muscle the pharynx is drawn obliquely over to the sound side — "mouvement de rideau." Does not the President's reference to his own work deal exclusively with the afferent innervation of the face, and not the efferent? If Dr. Kennedy's work referred to a dual innervation it antedated all other work in this line by quite a few years.

Dr. Kennedy said his work does not conclusively show this point, but it was an adumbration of the study of the pressure signs of the face.

Dr. Stookey said he was pleased to know that Dr. Kennedy's work dealt solely with the afferent side, as he wished to emphasize that his paper this evening referred to a dual efferent innervation, not afferent.

A Psychiatric Study of Suicide.

Dr. Thomas W. Salmon read this paper. He said he desired to present the human, rather than the professional side of the problem. It is stated that there are few people who at some time or other of their lives have not thought of self-destruction, but it is not easy to see exactly what is meant by that statement. It is true that most people, in childhood, have visioned being laid out in the best chamber, surrounded by weeping relatives and members of the family, who are overcome with grief at their former unappreciation of the departed. Thoughts of suicide are almost equally wide-spread, and most people who have left autobiographies have spoken very definitely of suicide, but these thoughts are usually disposed of by the mechanism which we possess to dispose of ideas which interfere with our happiness, and the relative infrequency of suicide accomplished, as compared with thoughts of self-destruction, bears witness to our power of preventing this type of casualty.

Apart from the human standpoint, suicide is of interest as a psychiatric study: first, because it is due to a preventable phase of mental disorder; and, second, because it involves questions of therapeutics and of hospital management. Recently suicide has taken on a new and wider interest, and it is from this larger viewpoint of methods rather than material that we have undertaken this study. Not only were cases considered which were allied to frank mental disorder, but also those in which this strange disturbance of human conduct occurred in sane persons.

Dr. Stearns took as an associate in this study a well-trained social worker, and tried to follow up every single case. A period of six months was taken for intensive study. The studies presented many difficulties, because it was not always possible to precede the undertaker or to follow the police, or to be welcome in every home, but every available channel of evidence was used.

The successful collection of minute details for study was due to splendid cooperation on the part of those interested in the study, such, for instance, as medical examiners. After these people, it was found that the gas companies were those next interested, whether on account of the amount of gas wasted or not, is not clear.

Generally speaking, it would seem to be a simple matter to determine whether or not suicide took place, but those who have studied the subject tell us that probably not more than two-thirds of suicides are reported, and that many cases are mistakenly termed suicide; also many cases are associated with homicide, so that a double toll of lives has to be estimated. Any personal stress or economic stress may be associated with suicide, but no one knows the exact proportion of these cases.

Sentiment which interferes with these investigations may be of two kinds: in some cases the relatives want the suicide made widely known; this usually has to do with various religious procedures which are modified in case of suicide: on the other hand, every effort is made to assign the death to natural causes instead of to suicide. For this reason one sometimes gets better evidence from neighbors than from relatives. Dr. Stearns found a typical illustration of this in one case of a very old man who suicided. The relatives were reticent but a carpenter, who lived next door, told the doctors that he knew the old man would commit suicide, because he sat for hours in the carpenter's yard without speaking, and when he spoke it was to complain that his bowels ended in the middle, and that a man in that condition ought to be dead. The physician who attended the family confirmed this evidence.

Suicide from suggestion is not uncommon. One very old man travelled all the way from Chicago to hang himself in a certain barn, because it was the custom for members of his family to do so, and he wanted to commit suicide in the orthodox way. The obvious cure in a case of this kind would be to burn down the barn and prevent further incidents. In New Orleans there is a "suicide oak" which no doubt has helped, with the aid of suggestibility, to put many persons out of the world.

The statistical study of suicide shows that it is steadily on the increase in all American cities. Many theories have been advanced, but the one most feasible is the fact of the steady drift of the population to the cities. Why suicide should be more common in cities needs careful analysis. Perhaps availability of weapons has something to do with it, as also the ready supply of gas. Dr. Stearns found a very striking relation between depression and suicide, and also that the suicide rate rises with every decade of life in a uniform manner. In the eighth and ninth decades it is remarkably high. He found a high racial rate among the Irish, in contrast to the low rate found by other workers. Among the foreign born the rate is higher. This reflects the greater economic stress in this section of the community.

Factors of medical interest are those of relation of suicide and mental disease; 42 per cent of cases give a history of mental disorder, and if we include psycho-neurotic cases this rises as high as 58 per cent. Where mental disorder is present 70 per cent of all suicides occur in the manic depressive groups; 23 per cent have other psychoses making a total of 93 per cent of mental disorders in which depression is a marked factor. Contrary to the usual idea, there are often depressive cases and suicides among psycho-neurotics. If it were not for the fact that most mental cases are hospitalized and guarded, the number of suicides in this group would be alarming. In a group of this kind studied, 157 in number, 7 were among children. Child suicide has been made a study by itself, but Dr. Stearns secured full data in these cases, and it was surprising what abnormality existed long before suicide occurred.

This wealth of descriptive material points to definite measures of prevention. The figures for the suicide death rate are higher than that for typhoid fever. We spend large appropriations on prevention of typhoid, but we do nothing to prevent suicide. The very first preventive measure of importance that occurs to one is the importance of recognizing depressions in their earliest stages. This is a responsibility for the public and for the medical profession. A distinguished surgeon in Chicago told me that a minister of his acquaintance was fond of coming into his office, and that the man wasted the doctor's time by telling him how worthless he felt himself to be, and what a discredit to his profession. The surgeon said to him: "If I felt like that, I would go to the lake and walk east till my hat floated." Finally, this is exactly what the minister did. The suggestion was the final link between depression and suicide. The danger is greatest in the early and the late stages of manic depression. In the severe stages the mind does not focus clearly on the suicidal idea.

In one case recalled, that of a magazine writer, the man came into my office and introduced the topic of what became of unclaimed bodies found in the East River. He said he had a professional interest in the problem. The man had a pallid, unhealthy appearance and it was suspected that he was suffering from depression. I told him that the bodies were distributed to the various dissecting rooms for the use of medical students. Feeling that confession might pave the way to relief, I went on to speak frankly of the subject of suicide in general and to sketch an outine of the questioner's probable mental symptoms. This produced a response on his part, and he admitted to me that he was suffering from acute mental depression. I hold him that his symptoms were extremely susceptible to treatment and urged him to go to a hospital to be taken care of. Arrangements were at once made for his reception at Bloomingdale and that same evening he was under hospital care. He expressed himself as well satisfied, and stated that he felt very much safer when he

saw the nurse patrolling the corridors at night and he was able to rest comfortably. Unfortunately, his brother came on from Chicago and was very indignant that the patient had been placed in an institution by a "fool doctor." He took his brother out with the idea of taking him home. It was stated that on the journey home the patient appeared unusually light-hearted and facetious. He was sure that the patient was much better. On arrival the patient made an excuse to go to the bathroom for a few minutes, and when there he cut his throat. This case illustrates the absolute necessity for care in the early depressive stages and indicates clearly the need for early treatment.

During the war statistics showed that war must have been in some measure a substitute for suicide. The A. E. F. figures were 5 per 100,000, in contrast to the regular army figures of 53 per 100,000. This large difference probably needs many causes to explain. One factor may be the exclusion of those obviously suffering from mental disorders. Hospitals were available from the front line to the base for early mental symptoms, and the slightest abnormality was reported early. Probably the treatment was better in the Argonne than in New York City to-day.

We have very powerful resources in our prevention of suicide. Many patients who attempt suicide give positive evidence of a long period of conflict before the act. between the desire to die and the instinct to live. The Rev. Dr. Warren has instituted what he calls the Save-a-Life League. He answers telephone calls from people about to commit suicide. He has some one on hand day and night, and by entering the field from a different angle, that of religious and moral counsel. he saves people at a critical time. He has a wonderful collection of letters and histories testifying to the results obtained. Probably the most powerful aid is the factor of human friendliness, which is so often lacking in our medical treatment of these cases. One is struck by the extreme loneliness and isolation of the sufferers seen at Bellevue hospital, after being rescued from attempted suicide. A powerful human resource has not been put into use. In Japan there exists an anti-suicide league, and on the railway crossings it is suggested that these should not be used for suicidal purposes. Whether the suggestion works in the direct or the reverse fashion is doubtful.

The suicidal intent often lasts for years and years before consummation. In Wisconsin, in an insane asylum, a man built an extraordinary barn, with fantastic cupolas. He kept adding one after another, and when he was unable to add another, he hanged himself on the last one. The constructive work had probably been a sort of safeguard, and when this was exhausted, he suicided. Had the architectural standards of Wisconsin allowed of an indefinite number of cupolas. he might have lived to old age. In another case the safeguard proved to be an altruistic reason. An insane man, while walking with a new attendant. tried to jump into the river. The attendant cried out anxiously, "Don't

do that or I shall lose my job." This plea deterred the suicide at the moment of impulse.

In regard to other preventive measures, Dr. Stearns suggests that something might be done to lessen the extreme suggestibility of the intending suicide. While the world cannot be adjusted to the psychopathic mind, one can place some restrictions as to suggestion on the movies and the drama. Firearms and gas can be safeguarded. The fact that there is a diminution of suicide by drowning in winter, on account of the freezing water, shows that availability has something to do with it. The policy of avoiding frank discussion with the patient seems to be a poor one. Often confession proves helpful. The details of general statistics tell little, and the method for future study is the carefully worked out case method, from histories of patients who have been rescued. The time for prevention is during the early and late stages of depression, when there is a conflict between the desire for life and the choice of death.

Discussion: Dr. Smith Ely Jelliffe said that the subject was so large that many points have, necessarily, to be left untouched. The metaphor of the barn, used by Dr. Salmon, could be taken as an illustration of a type of reconstruction process which takes place in the mind of many neurotic patients. The construction of psychologcal barns can be seen as a protective mechanism. If this fact is not recognized, the patient may, in the end, get beyond protective mechanisms. Another important point is the recognition of the fact that what may appear as a psychoneurosis on the surface may be the early stage of a severe mental disturbance. The psychiatrist must endeavor to change the mode of expression of the patient into something beneficial. Delusions represent ego-protective devices, and they may be piled up more and more, one above the other. At times these delusional formations of pronounced grade may be replaced by religious, by mystic or by other expression of a less *outré* type. The early and late stages in manic-depressive patients are particularly dangerous; in the early stages they are suicidal, not having built up their delusional defense mechanisms; in the latter the patient has come through a rich delusional stage and has to be protected until he gets back to his average. In regard to methods, the analytical method is often much condemned because so frequently misunderstood, but it may be helpful at a certain stage and more often saves the patient from the river than drives him to it, as some superficial and non-psychiatrically trained physicians often claim. To frighten patients away from a competent psychiatrist is as criminal as it is to allow non-technically trained people to treat mental illnesses.

Dr. S. R. Leahy said that while dementia precox is not usually thought to be associated with suicide, this is not an infrequent combination. When one considers the type of hallucinations, it is surprising that more suicides do not occur. The patient may endeavor by suicide to escape the imagined dangers threat-

ening him. The dementia precox suicides are impulsive in type. They do not speak of the intention, and evade the issue. If once prevented, they become more determined to suicide. In individuals with marked mental and motor retardation suicide is unlikely. They cannot plan self-destruction. The fact that families do not want to put depressed patients in hospitals often leads to suicidal attempts. They are not properly guarded. Patients with alcoholic hallucinations are apt to commit suicide on impulse, to escape their terrors. They are likely to jump off ferry boats or to do similar acts. Any condition, organic or functional, producing depression, makes suicide likely. This is seen in arterio-sclerosis or general paresis.

Major Jarvis (by invitation) said that the profuse advertising of every suicide case, with its appeal to suggestion, is to be deplored. Considering environment in rural districts as a factor, Bismarck drew settlers from remote districts for his rural communities, because of the large percentage of suicide. Environment is an important factor, as evidenced by the frequency of suicide at a post in Northern Arizona, called in the army "Suicide Post." Four officers attempted suicide there, and even one Indian, which latter was a very unusual occurrence. This post is 110 miles from a railroad, and is situated near a dark canyon, at the foot of a high lava mountain, which occludes the sun at 4 p. m. This gloomy environment is doubtless a contributory factor. Bluntness is sometimes helpful in dissuading a suicide. This is illustrated by the story of a rough and ready old army colonel in whose command a suicide epidemic appeared. He called for one man suspected of contemplated suicide and roughly told him that if he wanted to shoot himself he should go out on the lot and do it, instead of messing up the barrack room floor. The result was that the man decided not to commit suicide.

Dr. L. Pierce Clark said that he believed that the personal morale and sense of identity in the country constitute a factor against suicide as compared with looseness of standards in the city. He had been impressed with a peculiar psychology in some depressives. They seem to have a sense of separation from God, by reason of sin, and plan suicide with expiational intent. If they are rescued, and if the intent was sincere, they feel that they have done, as it were, all they can, and have thereby atoned. Thereafter they get well. If they do not make a sincere attempt, they still feel they have to go through the ordeal, and they do not improve. Might this not suggest the advisability of letting these persons really attempt suicide, taking precautions to rescue them, so that they can gain this sense of rehabilitation which helps in their cure? This should be carefully studied. In regard to the many patients at Bellevue, some of these persons confess that no one is left to really love them. This means that the outstream of the libido has lost its attachment and has resulted in attempted suicide, and extreme gesture of despair.

Dr. Kempf said he was inclined to take issue with Dr. Salmon

regarding methods. He felt that often the part of the body is attacked which is associated with some pain or discomfort, as, for instance, in the case of a man who complained of intense headache and shot himself through the head; and one young woman who suffered precordial pain, shot herself through the heart.

Dr. Wechsler said that in some cases, such as the hebephrenic types, the impulse has no logical basis.

Dr. Foster Kennedy said that psychological facts are often expressed in the lay literature. Benson wrote of a stranger in London feeling so "D——d anonymous." In regard to the A. E. F., men who wanted to commit suicide put themselves in murderous positions in the front line. In Europe the method by drowning seems more popular than other methods, and has no seasonal variation. In studying the suicide rate in Saxony, compared with that of Ireland (358 against 17 per 100,000), it would seem that there must be something more than individual variation.

Dr. Salmon, in closing, said that the increase of suicide has no doubt something to do with the choice of methods. There is avoidance of mutilation by women and the preference for fire-arms by men. In the army, shooting is often chosen because it is considered more or less a soldier's death and somewhat removes the stigma. In regard to the story of the blunt colonel, doubtless the frankness was useful in preventing the issue. In regard to the A. E. F., it must be remembered that only 60 per cent of the men were actually under fire. Some general cause must have operated to lower the suicide rate as after the armistice it resumed the former proportion. In regard to loneliness in the country, that cannot be compared to loneliness in a large city. There are at present 75,000 ex-service men in New York whose homes are distant. That must have some effect in increasing city loneliness. Non-mental cases are of peculiar interest. The subject is very large and it is impossible to touch more than the outline. The best method of study is the careful detailed case study of the patient who has been rescued from attempted suicide. There is a rarity of second attempts. Something has occurred in the life of the patient along the line suggested by Dr. Clark. Often the suicide finds his first friends in the hospital. He is clapped on the back and the friendly, democratic atmosphere increases the homely, human resources of the hospital and adds to its therapeutics. The days of statistical study alone, and of the measurements of skulls and ears are past. When we carry out careful, detailed study of living cases, as a routine measure, we shall know more about the psychology of suicide than we do to-night.

IODIDES, OBSERVATIONS UPON THEIR USE AND VALUE, INTRAVENOUSLY.

DR. FREDERICK J. FARNELL.

[AUTHOR'S ABSTRACT.]

Comment: Can it be that tissue and cell changes can be more rapidly brought about by giving a highly concentrated solution of sodium iodide directly into the blood stream?

Could the same result be obtained by giving a concentrated solution along with a bland syrup, by mouth?

Do the apparently good results depend upon the high concentration or upon the intravenous channel of administration?

Summary: Iodine in the form of an iodide can be given in hypertonic form intravenously.

Iodine when given into the blood stream in hypertonic form has a tendency to reduce the idiosyncrasy towards iodism.

Iodides introduced into the blood stream appear to readjust systemic fungus disturbances (oidiomycosis) very rapidly.

Iodides intravenously in concentrated form appear to help materially the action of salvarsan upon the diseased tissue and cell.

Iodides introduced into the blood stream in hypertonic solutions probably have some influence upon reducing the edema, hyperaemia, etc., of the brain in increased brain bulk disorders.

DISCUSSION: Dr. Smith Ely Jelliffe said that he was called upon once to write a book upon pharmacology and therapeutics, and also to lecture upon the subject, hence his special interest in Dr. Farnell's presentation. In recent years he had noted a definite restoration of the subject to a place of respect in teaching and to a renewal of interest in the action of drugs on the human body. Pessimism is receding and a healthier pharmacology advancing. The role played by iodine in the body is extremely important. The iodine mechanisms are extremely intricate and only partly analyzed, the chief question opened up being the iodine content of the thyroid. He had hoped that Dr. Farnell would touch upon the action of iodine on the sympathetic side of the arc of the vegetative nervous system. The vegetative nervous system is definitely affected by iodine, chiefly on the sympathetic side. This in turn influences body metabolism. Dr. Farnell has approached the subject from a different angle — that of specific disorders.

Dr. J. H. Leiner said that in regard to the combination of iodine with salvarsan medication, there is now a routine practice of this method in Vienna. It is seen that iodine enhances the effect of salvarsan given intravenously.

Major Jarvis (by invitation) said that Dr. Nicholas Senn of Chicago had noted the absence of tuberculosis and of skin diseases among the Esquimaux. This he thought due to the large amount of iodine in the blubber and fish which form their

staple food. These people fall prey to tuberculosis and respiratory diseases when they come to a temperate climate.

Dr. Foster Kennedy said that Hoover put an end to the epidemic of adolescent tuberculosis by increasing the fat ration in Vienna.

Dr. Farnell, in closing, said that this work was experimental. He first tried giving large doses of potassium iodide intravenously, but it caused thrombosis from irritation of the vein lining. He then tried injection of 400 grains of sodium iodide in a case of oidiomycosis. The patient was comatose for a day, but recovered without any ill effect. The man was cured of lesions of the lung and of the central nervous system. The sodium salt injection was apparently harmless.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY.

REGULAR MEETING, NOVEMBER 17TH, 1921.

DR. JAMES B. AYER, PRESIDENT, IN THE CHAIR.

SCHIZOPHRENIC DETERIORATION. BIO-CHEMICAL STUDIES AND PRESENTATION OF CASE.

DR. KARL M. BOWMAN presented a boy of 15, who came for treatment because he was nervous, losing weight, weak and not getting along well. His father had a somewhat similar condition when he was this boy's age, but apparently recovered and has gotten along fairly well in life. This boy has always been sensitive and has shown seclusive traits. He has never been rugged and has been physically afraid of other boys. In December, 1920, the boy commenced to lose weight. He is much wrapped up in his own thoughts and it is not entirely clear just what these ideas are. The tendency to day dreaming is not very far advanced. He complains of dizziness, poor appetite, headache and various bodily symptoms. He has had fits of irritability during which he has broken some things, and also spells of crying.

The physical examination shows that he is not well developed, has poor expansion, blood pressure is 115/78. His fingers are long and graceful. He has no axillary hair and pubic hair is of the feminine distribution. General medical examination negative. Basal metabolism on four different examinations was —24, —31, —37, and then, following the feeding of thyroid extract — one grain a day for two weeks — the last reading was —25. X-ray of the sella was normal. The blood chemistry was within normal limits. Spinal fluid negative, urine negative, blood negative. Hemoglobin 85%.

A further investigation along these lines is shown by a chart which gives the results of testing nine cases of dementia praecox, seven of which are of the paranoid type and two of which are hebephrenic. They are all cases of long standing. It was felt that laboratory studies over a certain series of cases might reveal the possibility of certain definite laboratory findings which would be constant in all cases. Consistently negative findings would be an equally valuable observation or even a marked scattering of results would be valuable. Twenty-four hour specimens of urine were examined quantitatively for acidity, total nitrogen, ammonium nitrogen, uric acid and chlorides. Some of the findings were low and some were high, and there was no constant feature in the urine findings. This merely confirms Dr. Folin's findings as far back as 1904-5, for the work he did then in urine studies was interpreted in much the same way. Next the blood chemistry was studied. Quantitative examinations of the non-protein, nitrogen, dextrose, uric acid, chlorides, and carbon dioxide combining power were

made. In the non-protein nitrogen test all but one fell within normal limits. In the dextrose test three were above normal limits and there seemed, perhaps, a tendency for the sugar to run higher than normal. In the uric acid test the findings were within normal limits. In the test for chlorides the findings except two were within normal limits and those were very close to it. The carbon dioxide combining power of the blood was within normal limits. The blood sugar tolerance curves showed great variation with no constant type of curve, but a considerable number were definitely abnormal. The basal metabolisms were done. Two were between 0 and +3, and the rest fell below 0. One was —8. Three were between —10 and —19 and two were —20 and one was —27. This was of some significance and in view of the case presented it would seem that this point is worthy of further investigation. The renal function test was done and showed the lowest result as 62%; all were, therefore, quite normal. The Goetsch test was entirely negative in every case. The hemoglobin was tested in all cases and the findings were entirely within normal limits. The red counts were high, the white normal. We felt that in reviewing these findings we had a very definite tendency of the basal metabolism to fall below the normal and we had a large number of abnormal sugar tolerance curves, but no constant picture. The other findings all seemed essentially negative.

Discussion: Dr. C. Macfie Campbell said that the observations are of great importance, because in these deteriorating cases one is dealing with a type of disorder which is of great severity, extremely frequent, and of great social importance. After all, the greater number of patients for whom the State is responsible, are those cases of deterioration of which this boy is one type, and therefore, it is one of the most important of problems. The tendency in studying these cases has varied from time to time. If auto-intoxication was in vogue, the physician looked for auto-intoxication. Focal infections came up and the teeth were taken out and the individual was well pruned. The libido later claimed attention and the libido was traced by some from its genesis to its maturity. There are few patients who have been studied in their entirety. As a rule the presentation of a case has been from one aspect. Perhaps of the greatest importance at the present moment, is the study of such patients in toto, to see if at the root of their emotional difficulties there may not be some disorder which may be formulated in simpler terms. Each man is different from his neighbors. Is one to formulate the constitutional traits and maladaptations in complex terms of the emotional life or can a key be found to these traits and to the disorder in metabolism or the chemical energies of the system? This patient is studied from this standpoint and his basal metabolism is found to be low. Is that one of the fundamental component factors which produce the total fault? In his emotional life is his limitation (lack of plasticity of the libido) largely due to the fact that some of the elementary components are lacking? The time may come when the etiology of these disorders is not sought in one popular formula or another but an effort will be made to understand the

constitutional endowment of the individual both in its simple and complex factors.

Dr. W. B. Swift said he hoped that something will be done with the speech in cases like this. When working in the Psychopathic Outpatient Department, he had made a series of speech tests on ten patients of each psychosis. He found new and as yet unpublished signs in speech in all except one, and in general paresis, four or five.

Dr. J. B. Ayer asked Dr. Bowman if he had succeeded in raising the metabolism of these patients showing a low rate, what he had used, and with what success.

Dr. Donald Gregg asked if an early tuberculosis infection had been looked for in this case. Tuberculosis would give more or less the same picture.

Dr. Bowman, in closing, answering Dr. Ayer, said that in only one case was an attempt made to raise the basal metabolism. One started with one grain of thyroid and then the patient decided that yeast would do him more good than thyroid. He did not believe the sugar tolerance could be interpreted. In diabetes the sugar curve mounts up at the end of the first hour and does not return to normal at the end of the second hour. In certain endocrine disturbances, in hyperthyroidism and hyperpituitarism there is this diabetic curve. In hypothyroid and hypopituitary conditions there is the exact opposite type of curve for at the end of the first hour there is almost no rise in the blood sugar and at the end of the second hour it is entirely back to normal or below normal. It is claimed by certain writers that there is a typical curve in dementia praecox. Their report does not confirm these findings. As regards the findings in early tuberculosis. there should be a certain amount of fever. In that case the basal metabolism would be definitely increased and not decreased.

HYSTERIA AND PERSONALITY.

Dr. Martin W. Peck presented a girl of nineteen, who had been admitted to the Psychopathic Hospital six months previously, with nearly complete hysterical paralysis, aphonia, and a mental state of anxious, fretful hypochondria. There was a history of two similar attacks during a period of two years. After two months without change, she suddenly recovered and has been ever since in robust physical health and without somatic complaints. At the same time she developed a type of disagreeable behavior which has kept things in a turmoil, and has made it impossible for her to return home or get on in other than hospital environment. She appears to derive her main satisfaction in teasing, ridiculing and interfering with those about her, but it is all done in a mischievous and semi-playful, rather than malicious manner. She also indulges in much troublesome horse-play, and is tiresomely talkative. Her past history proves that this conduct represents in a general way, her usual state since childhood. In play and in school, she did not get on with her mates, at home she antagonized the neighbors; and her working career included frequent changes of position and continuous petty

friction of her own making. She shows lack of normal affection and absence of serious purpose in life. In appearance she is attractive and graceful; she has normal intelligence and considerable artistic ability. At no time has she been delinquent in the usual sense of the term, or shown tantrums of any order. While friendly enough toward physicians, it has never been possible to establish sufficiently frank relationship to unearth the deeper factors in her character difficulties. The case was discussed from the standpoint of descriptive analysis and her personality defects outlined by grouping them in the fundamental spheres of reproductive, herd and self-preservative activities.

Discussion: Dr. H. C. Solomon asked Dr. Dewey and Dr. Walton what their attitude would be toward the question of the commitment of this girl. Would they be willing to go before a court and ask for her commitment.

Dr. G. L. Walton said he should not be willing to commit her without further investigation. She appears like a high grade imbecile. She has a hypermanic tendency, a lack of moral sense and pleasure in disturbing other people.

PRESENTATION OF CASES OF ORGANIC PSYCHOSIS (LETHARGIC ENCEPHALITIS).

Dr. Lloyd T. Thompson said that in the past two months, at least five cases had been seen in the Psychopathic Hospital, in which the diagnosis of encephalitis lethargica is the most probable one, but owing to the fact that there is no epidemic of this disease at the present time, and that these cases are somewhat atypical the final diagnosis of that disease has not been made. The two cases presented were especially interesting because of the psychotic symptoms shown in addition to marked and changeable neurological disturbances.

Case I. A man 49 years of age, who was admitted with a complaint of tremor of the right arm and weakness of the entire right side. The onset was sudden, five weeks before admission, with dizzy spells, tremors, headache and dull pain over entire right side. At one time there was blurring of vision. On admission patient had a mask-like facies with weakness and hypesthesis of left side of face. Pupils were unequal and irregular but reacted normally. There was a coarse tremor of right arm and hand with weakness and incoordination on right side. Deep reflexes more active on left with Babinski on left. Reaction to pin prick lost on right side. The neurological picture was very changeable from day to day. A double ptosis and paralysis of left internal rectus developed. Repeated lumbar and cistern fluids showed only a consistent increase in the sugar content.

Patient was somnolent in the morning but became active toward evening. He became hallucinated and developed ideas of persecution. At one time he presented a typical manic condition with flight of ideas, elation, overactivity, etc. He was correctly oriented but showed impairment of memory and judgment.

Case II presented a similar history and changeable neurological disturbances, but the mental condition was somewhat different. On admission he resembled very closely a case of catatonia with sudden outbursts of aimless excitement. A few days later he changed and seemed more like a depression. He admitted that he was very unhappy and worried and there was marked retardation. Patient was hallucinated and had self accusatory ideas, but these symptoms have now disappeared. These cases were presented to point out the possibility of sporadic encephalitis or the possibility that they may be the beginning of another epidemic. They also serve to illustrate the prominence of mental symptoms and the close resemblance to other forms of psychoses.

DISCUSSION: Dr. H. I. Gosline asked what was the actual reading of the gold sol. It has been reported that the gold sol did show something specific in cases of encephalitis lethargica.

Dr. D. J. MacPherson asked to what extent is it true that increased sugar is present in encephalitis lethargica?

Dr. Harold E. Foster said that in the series which were in the Massachusetts General Hospital, increased sugar was a very constant sign. It was present in all cases. An interesting feature was that in the fatal cases the spinal cord sugar ran markedly high. It also ran very high in an encephalitis case with acute retention. Syphilitic cases, especially general paresis, run fairly high, but not as high as encephalitis, although they may overlap. In laboratory work it cannot be said that any one thing will make the diagnosis. The diagnosis of encephalitis can be questioned in any case that has run for any length of time with a normal spinal fluid sugar.

Dr. Thompson said that the gold sol readings were actually negative except for a few changes to "ones." There is no characteristic reading for encephalitis. It may be anything from a negative to a "paretic curve" reading. However, the changes that do occur are in the first five or six tubes and very seldom in the tubes of greater dilution.

HISTOLOGICAL EVIDENCE OF THE RESULT OF TREATMENT OF GENERAL PARALYSIS.

Dr. Harry C. Solomon and Dr. Annie E. Taft read this paper. The object of their investigation was to determine if treatment of cases of general paralysis produced any effects that might be observed histologically. For this purpose a histological examination was made of the brains of twenty-seven patients having had general paresis to whom treatment had been given. These were compared with a series of fourteen untreated cases. Sections were taken from twenty-four areas in each brain; sections were stained by cresyl violet. Realizing that the histological picture varies from different areas of the same brain, the twenty-four areas were studied from each brain and thus a fair idea of the situation could be obtained.

One striking feature of general paresis is the presence of plasma cells in the perivascular infiltrations and in the meninges. It is pretty generally accepted that plasmacytosis is essential for a diag-

nosis of general paresis. A lantern slide picture was shown from a case of untreated general paresis showing a small vessel surrounded by an infiltration consisting almost entirely of plasmacytes. A second picture was shown from a case of general paresis that had received treatment. Vessels here showed some perivascular lymphocytic infiltration but no plasma cells. This was said to be the rather characteristic finding that differed in the treated and untreated cases, namely in the treated cases plasmacytes were comparatively rare as contrasted with the untreated cases.

The results of the examination of twenty-seven cases receiving treatment were charted. Sixteen of the twenty-seven cases showed practically no plasmacytic infiltration. Six showed a moderate amount, and five showed a considerable amount. Of the five that showed considerable plasmacytic infiltration two or three had a fair amount of treatment and the other two had very little. Contrasted with this finding in the treated cases were the findings in the untreated series of fourteen. Of the fourteen untreated cases, nine showed a considerable degree of plasmacytic infiltration, and five a moderate amount and none of them showed a very slight infiltration as was found in the sixteen of the twenty-seven treated cases. The story concerning the perivascular lymphocytic infiltration is similar but not so marked. Twelve of the twenty-seven treated cases showed a slight infiltration, ten a moderate amount, while five showed considerable. It is worth noting that a number of the cases showed a fair amount of lymphocytic infiltration and very slight plasma cell infiltration. In the series of fourteen untreated cases not one was relatively free from lymphocytic infiltration, whereas nine showed a moderate perivascular lymphocytic infiltration and five showed a marked infiltration with lymphocytosis. A number of the brains had had the pia stripped before being obtained for examination. However, there were nineteen of the treated cases which had the pia intact. Of these, nine showed a slight pial infiltration, seven moderate, and three considerable. In eleven of the untreated cases it was possible to examine the meninges. Of these, one showed slight pial infiltration, four moderate, and six considerable. As regards the pial infiltration it is rather striking to find that three of the treated cases had a considerable amount of pial infiltration with lymphocytes. *A priori*, it would seem that the pial inflammation is readily amenable to anti-syphilitic drugs but histological evidence in these cases points to the fact that there are cases in which the anti-syphilitic remedy does not give satisfactory results even as regards the pial infiltration. As to the glia cell picture there was no evidence of difference between the treated and untreated cases. One would feel that from the differenc in the type of the plasma cell picture it is possible to make a fair estimate by a histological examination as to whether the cases had received anti-syphilitic treatment. They believe they are justified in drawing the conclusion that something has been accomplished by the treatment of cases of general paresis as shown by the histology, even though this may not have any clinical value.

DISCUSSION: Dr. H. I. Gosline said that one slide seemed to show a certain paucity of nerve cells. Have such areas in treated cases been compared with similar areas in untreated cases? His reason for asking that, is that he had noticed in carrying out this treatment, that neoarsphenamine will start a severe dermatitis and lead to cicatrization if one does not cover the fingers. Then again the cell count drops as a most constant and uniform occurrence. Does this arsenic act as a sort of searing process, killing off epithelial cells, and does the cured paretic get on because he has a sufficient number of nerve cells left to function although he has been injured?

Dr. Donald Gregg asked what happened to the ten cases under treatment that were reported on a year ago?

Dr. Solomon said one of them has had a relapse.

Answering Dr. Gosline's question, he said these cases had been studied in a great deal more detail than he had attempted to show this evening. The glia cells, the white substance, the ventricular surfaces, the dropping out of cells, were studied and they had attempted to see if there were any relation to the age of the patient or to the duration of the process. He did not believe they would have any very striking results. Why some cases die with a small amount of atrophy and some with a tremendous amount is unknown to him. As to the spinal fluid findings, some rather disappointing results have occurred. Some of the cases in which the spinal fluid was practically free of cells during life show marked evidence of meningeal and perivascular infiltration. In one case particularly, in which apparent cure had been accomplished, the serology was entirely negative, yet there was perivascular infiltration and meningeal involvement. Dr. MacPherson asked whether it was a good thing or a bad thing to lose one's plasma cells when one has paresis. He did not know. The fundamental study they would like to make, would be on the amount of spirochetosis these brains show, but this is not possible at present, due to the technical difficulties in demonstrating spirochetes.

CURRENT LITERATURE

VISCERAL NEUROLOGY.

1. VEGETATIVE NERVOUS SYSTEM.

Albert Kuntz and O. V. Batson. EXPERIMENTAL OBSERVATIONS ON THE HISTOGENESIS OF THE SYMPATHETIC TRUNKS IN THE CHICK. [Jour. of Comp. Neurol., 1920, xxxii, December, 335.]

As the findings of Kuntz that cells of medullary origin play an important part in the development of the sympathetic nervous system have been doubted by others, he and Batson have tried by crucial experiments to eliminate the neural crest and the dorsal portion of the neural tube before the spinal ganglia have become differentiated: if this could be done, and it were still found that the embryo continues to develop without spinal ganglia and dorsal nerve-roots, the remaining portion of the neural tube would be the only source from which cells of nervous origin could migrate along the paths of the spinal nerves. If in such embryos the primordia of the sympathetic trunks should arise they would of necessity arise from cells which migrate from the neural tube along the paths of the ventral roots of the spinal nerves. In these experiments chick embryos were subjected to operation at the close of the second day of incubation (48 hours), at which time the spinal ganglia are not yet differentiated: the dorsal portion of the cerebrospinal nervous system was destroyed by electrolysis throughout a limited portion of the trunk region. By this means the writers obtained conclusive evidence that cells of medullary origin, which advance peripherally along the ventral roots of the spinal nerves, enter the primordia of the sympathetic trunks. The spinal ganglia are not excluded as a source from which cells may enter the primordia of the sympathetic trunks under normal conditions; however, these primordia may arise from cells derived from the neural tube only, at least when cells which have their origin in the spinal ganglia (or neural crest) are excluded.

"As observed above, the primordia of the ganglia of the sympathetic trunks may be approximately of normal size in segments in which the spinal ganglia and dorsal nerve-roots are absent, but the remnant of the neural tube is relatively large. On the other hand, these primordia are small or entirely absent in segments in which the remnant of the neural tube is small and represents only the most ventral portion of the central nervous system, even though ventral nerve-roots are present. These facts suggest that the cells which normally give rise to the ganglia of the sympathetic trunks are derived largely from those portions of the walls of the neural tube which give rise to the lateral

cell-columns. Theoretical considerations also favor this interpretation; however, we do not feel that the evidence at hand warrants a definite conclusion on this point." [Leonard J. Kidd, London, England.]

Kuntz, A. The Development of the Sympathetic Nervous System in Man. [Jour. Comp. Neur., October 15, 1920.]

From a study of embryological material, Kuntz shows so far as ontogeny can show that the primordia of the sympathetic trunks arise in human embryos of about 5 mm. They first show as a small group of cells lying along the dorso-lateral aspects of the aorta in the lower thoracic and upper abdominal region. Six mm. embryos show them from the lower cervical to the sacral region. When the embryo reaches a length of 10 to 11 mm., the primordia are then noted in the upper cervical region as well. These primordia arise from cells of cerebro-spinal origin advancing peripherally along the dorsal and ventral roots of the spinal nerves. The vagal sympathetic plexuses arise in similar fashion and advance along the vagi. The more distal enteric plexuses arise from cells derived from the sympathetic supply in the lower trunk region. The ciliary ganglion is derived from the semilunar ganglion *viâ* the ophthalmic nerve. The primitive cells of the spheno-palatine ganglion advance along the greater superficial petrosal nerve, originating also from the semilunar ganglion *viâ* the maxillary nerve. The otic ganglion arise at the growing extremity of the lesser superficial petrosal nerve. The petrosal ganglion also receives cells of trigeminal origin *viâ* the mandibular nerve. The submaxillary and sublingual ganglia arise on the lingual nerve primarily from cells of trigeminal origin. They probably receive some cells of facial origin *viâ* the *chorda tympani*. The smaller ganglia on the glosso-pharyngeal nerve in the posterior portion of the tongue arise from cells which advance into the tongue along the glosso-pharyngeal fibres. The cells which give rise to sympathetic neurones are derived from both cerebro-spinal ganglia and the neural tube. Not all of those cells actually migrate as such, as many arise by mitotic division of the migrant cell along the paths of migration and in the primordia of the sympathetic nervous system.

Eyster, J. A. E., Middleton, W. S. Auriculo-Ventricular Heart-Block in Children. [Amer. Jour. Dis. Child., February, 1920.]

Twenty cases of heart-block in children, nearly all of which were definitely or probably of congenital origin or occurred during the course of severe and usually fatal diphtheria, are here reported upon. A personal case of partial auriculo-ventricular dissociation is added. This developed in a child of 2, apparently in connection with an acute nose and throat infection in which the cultures showed only *Staphylococcus pyogenes aureus*. The child, who was kept under observation for two years, developed normally. At the time of writing the cardiac condi-

tion was that of a well compensated mitral lesion associated with a 2 to 1 auriculo-ventricular block, with a ventricular rate between fifty and sixty.

G. C. Bolten. The Vaso-Vagal Attacks of Gowers. [Psychiatrische en Neurologische Bladen, 1920, No. 5-6, 341.]

The vaso-vagal attacks described by Gowers are not very common. Bolten agrees with Gowers that they are closely related to epilepsy. These patients are almost always very neuropathic; their attacks occur mostly suddenly, at times apparently wholly spontaneously, at others in connection with exposure to cold or cold-stimuli. There is violent palpitation, the patient is tormented with a very severe and troublesome feeling of oppression, cold, "dead" extremities, paraesthesiae in hands and feet, and a great retardation of the line of thought. During the attack the patient is not unconscious, yet he feels that he cannot move his limbs; there is great inhibition of all psychical processes, and speech is impossible on account of a complete stiffness of the jaws, and in all four limbs he feels great tingling as if he had been sleeping on his arm or leg. In spite of the preservation of consciousness he can think only very imperfectly; he can assimilate all kinds of external impressions, but all the associational processes in his brain are strongly inhibited. So severe is the oppressed feeling that it brings him into a state of great anxiety, so strong that, even although he may have had many previous attacks, he feels always that he will die in this attack (apparently death has never occurred in an attack). Bolten records a case very graphically, and discusses the nature of these vaso-vagal attacks at length. He holds that they are very closely related to angina pectoris vasomotoria and to paroxysmal tachycardia. He strenuously denies that they are the sequel of a simple peripheral disturbance (vascular contraction or spasm), but holds that they are due to a more complex constitution-anomaly, viz., a vasomotor insufficiency. In these three types of attacks — which he regards as merely mutual variants — the usual considerable pulse-acceleration he looks on as a compensation-symptom; by increasing the number of ventricular contractions — which are in part true extra-systoles — the organism attempts to compensate for the harmful effect of the low blood-pressure. Bolten concludes that the vaso-vagal attacks of Gowers do not form an independent clinical entity, but are to be conceived of as a non-essential variant of paroxysmal tachycardia and of "pseudo-angina" (angina pectoris vasomotoria). [Leonard J. Kidd, London, England.]

F. Depisch. Pathology of the Vegetative Nervous System. [Wien. Archiv. f. innere Medizin, March, 1920, 1, 1.]

A unilateral vegetative nervous system syndrome is here described by the author. He tries to show by it, in comparing with others, that the

fibres of the vegetative system become crossed on their way to the periphery in a somewhat analogous manner to the somatic sensori-motor systems. The primary lesions causing such unilateral symptoms are usually some localized hemorrhage in the medulla oblongata, entailing bulbar paralysis. The unilateral symptoms included a higher local temperature, the unilateral action of drugs, pilomotor reflex variations, sweat differences, etc.

Andre-Thomas. THE PILOMOTOR REFLEX. [Rev. Neurol., 1920, 27, 1139.]

André-Thomas describes the receptive field, appropriate stimuli, and the characters of the response in this reflex under various conditions.

In the normal subject the pilomotor muscles may be excited directly by mechanical stimuli or reflexly. As a reflex it may be obtained by various stimuli applied to the skin, such as cold, friction, and the electric current. To unilateral stimuli the response is unilateral and may spread to the whole of the stimulated half of the body, or it may be restricted to one or more segmental areas. Certain cutaneous areas are particularly receptive, the nape of the neck and shoulders and the lower part of the axilla. When elicited from the neck the response is descending, and stronger stimuli are necessary to produce it over the head and neck. On the limbs, the extensor surfaces give the response more readily than the flexor surfaces. Bilateral stimuli produce a bilateral response.

In lesions of the spinal cord the response is exaggerated immediately below the upper level of the lesion. In total divisions of the cord, there are two forms of response: one above the level of the section, the "réflexe encéphalique," and one below, the "réflexe spinale."

The spinal reflex in total divisions of the cord makes its appearance when the isolated portion of the cord emerges from the spinal shock — that is, simultaneously with the mass reflex. It is elicited by the same stimuli as this reflex, namely, passive movements of the legs, etc. In these circumstances, the factors governing the distribution of the spinal reflex are the same as those governing that of the reflex sweating described by Head and Riddoch — that is, the distribution of the thoracico-lumbar white rami.

In partial lesions and in various diseases of the spinal cord, the response varies and is often difficult of interpretation. It is normal in poliomyelitis. In syringomyelia, variations in the response follow the distribution of vasomotor and trophic disturbances. In peripheral nerve lesions, the reflex response is abolished over the area of sensory changes, but, as Trotter and Davies showed, a local response to stimulation persists.

The cerebral reflex, that is, the response above the level of a cord lesion, varies greatly in facility and distribution. It descends to the level of the sympathetic distribution of the isolated portion of the cord.

In the normal subject the reflex is elicited by peripheral stimuli and also by various emotional states. The quality of the stimulus in both cases is similar and is strongly affective. In the former case, the sensations aroused by stimulation are of the affective variety and are unpleasant. Hence when the skin is anaesthetic no response can be obtained from it. The emotions producing the reflex are also unpleasant in quality. Fright and horror are the most adequate stimuli, but any profound emotion, whatever its quality, may be sufficient to produce it. The reflex of emotional origin is bilateral, that due to peripheral stimulation may be unilateral. The pilomotor reflex may therefore be regarded as an affective reflex. [F. M. Walshe in Medical Science.]

Rizzo, C. The Ciliary Ganglion and Inactivity of the Pupil. [Arch. biol. norm. e. patol. 1920, 74, 1.]

The much discussed problem of the pupillary reflexes is here taken up. With regard to the seat and nature of the lesion underlying the Argyll-Robertson pupil (alone, or associated with inactivity to accommodation), he quotes Marina and others as having asserted that in this condition the cells of the ciliary ganglion are reduced in number, and show chromatolysis, and that the myelin sheaths of the ciliary nerves are degenerated. Other observers, notably André-Thomas, have been unable to confirm this from the investigation of three cases. The author agrees with André-Thomas. He examined the ganglia from nine normal subjects, from eight paretics and one tabetic with Argyll-Robertson pupils, from two paretics with totally inactive pupils, and from one with defective reactions to both light and accommodation, and from one paretic with normal pupils. He failed to find any noteworthy degeneration of the nerve-cells, though a few cells showed some chromatolysis and swelling of the cytoplasm which were obviously acute and recent lesions attributable to the intercurrent illness which caused death. The roots of the ciliary ganglion, the short ciliary nerves, the nerve plexus of the muscle of Brucke, and the nerve filaments of the iris and cornea were all normal in every case. An exudate of lymphocytes and plasma cells was constant in the ganglia of paretics.

Fraikin. Solar Plexus Sign with Abdominal Neuropathies. [Paris Méd., February 14, 1920, 10 No. 7.]

Spontaneous pain or tenderness in the solar plexus is a not infrequent result of disturbance of the plexus. It is a sign that the circulation is hampered in or outside of the viscera, or the nerves are suffering from toxic action or from traction from sagging organs. This solar sign may serve to differentiate a psychogenic conversion pain, from a somatic visceral lesion.

Livierato, P. E. The Abdominocardiac Reflex. [Grèce Méd., Athens, Dec., 1920. J. A. M. A.]

Livierato reports that his own and others' extensive experience has confirmed the instructive increase in the size of the right ventricle by mechanical stimulation of the abdominal nerves. He taps along the median line in the epigastrium, the patient recumbent, the abdominal walls relaxed. The left ventricle shows no change, and there is no change in the healthy, but when the heart elasticity is below par, the right ventricle enlarges from this tapping, and it is thus a very useful sign of the condition of tonus of the myocardium, revealing insufficiency before it has become manifest in any other way. This reflex was always positive in patients convalescing from various diseases. Livierato reports further that when the right heart shows spontaneous dilation on changing from the recumbent to the erect posture, this is likewise a sign of hypotonicity of the myocardium. The dilation subsides spontaneously as the subject reclines again. This spontaneous increase of the heart area upward and to the right on change from the horizontal to the erect posture is always a sign of pronounced hypotonicity of the heart muscle.

Ant. Hutter. A Case of Myasthenia Gravis. [Psychiatrische en Neurologische Bladen, 1920, Nos. 5-6, 352, (6 figs.).]

The patient, a man of twenty-five, was a typical case of myasthenia gravis, with attacks of fatigue, extending over two and a half years, interrupted by remissions. In the attacks there were also bulbar symptoms and the myasthenic reaction. Death took place from a pulmonary lesion complicated with rapid exhaustion of respiratory and auxiliary-respiratory muscles. Necropsy showed microscopically a normal brain and a strikingly small pituitary. In the thymus-region there was a small fatty lobe; the vocal cords showed a mother-of-pearl glistering. Thyroid gland rather small; tongue appears fatty. A very fatty omentum. Spleen rather large, greenish, and shows plainly on section its follide-pattern; its pulp is swollen. Liver rather light-colored. Kidney very vascular, with strongly developed fat-capsules. Right adrenal very vascular; left very flabby, its cortex appears too thin. Prostate rather large with definite middle lobe. Microscopically, the central nervous system was normal; so also were the thyroid, adrenals, testis, pituitary, spleen, kidney, stomach, pancreas, and prostate. Tongue-muscle fatty. Rich lymphoid infiltrations in the muscle-tissue of the masseter, quadriceps, deltoid, and diaphragm, but not in the psoas. The biceps muscle showed degeneration, local lack of cross-striation, and marked increase of nuclei. The thymus-like fragment contained no true thymus tissue; the thymus was thus absent. The liver-parenchyma is definitely fatty. [Leonard J. Kidd, London, England.]

Marie, Bouttier and Bertrand. Progressive Myasthenia. [Annales de Med., 1920, 10, No. 3.]

Here the postmortem findings are given from a myasthenia gravis case which had been treated for some time advantageously by suprarenal extracts. The nervous system was found apparently intact; the classic picture of bulbospinal myasthenia without any appreciable lesions in the bulbar nuclei. Small lymphoid nodules were scattered throughout the suprarenals and the muscles, which the author states is evidence as to the relation of the adrenals to the disease. The improvement under adrenalin had persisted for six months when the woman died in a few days after the onset of pulmonary edema [excess of vagotonia.—Ed.]

Brun, R. The Origin and Symptomatology of Lumbago. [Schweiz. Arch. f. Neurol. u. Psychiat., 1920, 7, 63.]

Brun emphasizes that we have little accurate knowledge of the causes or nature of lumbago. At present, and largely on theoretical grounds, three clinical forms are recognized.

(1) *A myogenic form* in which the muscle is regarded as the primary seat of the disease. Rheumatism and trauma are generally regarded as the factors responsible for this form. Workmen who work half-stripped and subsequently become chilled acquire a rheumatic affection which remains latent until some strain to the lumbar muscles unmasks the condition by the sudden appearance of pain. (Primary rheumatic origin of traumatic lumbago.) Another view is that strain may make the lumbar muscles a "locus minoris resistentiae" upon which a subsequent rheumatic affection fastens. The importance of actual injury to the muscles, such as tearing, bruising, or haemorrhage, as factors in the production of lumbago is generally deprecated.

(2) *Osteo- or arthro-genic forms.* Torsion at the lumbar spinal joints has been suggested as a cause, but is probably exceedingly rare.

(3) *Neurogenic form.* Lumbago has been described as a true neuralgia of the lumbar nerves, as a toxic neuritis, or as due to injury of these nerves.

In the second section of the paper, Brun analyses twelve personally observed chronic cases of lumbago, all of which presented objective physical signs. From the study of these he finds that trivial injuries may give rise to severe lumbar pain ("Lumbalgie") of long duration, and that these cases are more numerous than is commonly believed; that careful clinical examination reveals in the majority of such cases definite objective physical signs in the affected region; these physical signs include unilateral changes in the lumbar and sacral portions of erector spinae — wasting, hardening, tenderness to pressure, changes of electrical excitability such as diminished faradic response and qualitatively altered galvanic response, and in two instances the presence of transverse furrows in the muscle due to localized spasm.

There were also symptoms referable to the lumbar vertebrae, such as tenderness on pressure over the spines, scoliosis convex to the normal side in three out of four observed cases, and also reflex rigidity of the lumbar spine from pain. Finally, nerve-root symptoms were frequently observed; pain and sensory loss in the distribution of the posterior cutaneous branches of the lumbar and sacral nerves and of the ilio-inguinal nerve, and pain along the distribution of the sciatic nerve. The pain and cutaneous hyper-aesthesian in the lumbar region he attributes to this nerve irritation. From these observations he concludes that chronic lumbago is essentially a perineuritis and neuritis of the posterior cutaneous branches of the lumbar nerves, usually of traumatic origin, and but rarely toxi-infective. The sciatic nerve may be secondarily involved. The condition is frequently complicated by neurotic symptoms. [F. M. Walshe in Medical Science.]

2. ENDOCRINOPATHIES.

O'Day, J. C. Toxic Goitre. [N. Y. Med. Jl., cxi., 1920, p. 6 et seq.]

In his chapter on toxic goitre O'Day will not admit the existence of a pathological secretion. Toxic goitre is toxic because of an over secretion of the gland's normal product.

He objects to the term Exophthalmic Goitre. He complains that text-book descriptions of the disease leave the impression that it is called exophthalmic goitre because the exophthalmus is a constant symptom. To quote, "It is no more exophthalmic goitre than it is death-dealing goitre for just as it may result in death may it also result in an exophthalmus."

Toxic goitre he found to be unlike all other varieties. The difference, both microscopically and macroscopically, was constant in several hundred specimens examined — that difference depended entirely upon a preponderance of the acini — "a preponderance that admits of little or no intervening stroma."

He holds the belief that because of this the gland is inevitably oversecretive and with so many follicles at work at and during the same time he conceives the idea that proper adulteration is prevented.

This is the way he puts it: "The secretion is thinner, being destitute of those albuminous elements which govern the consistency of that from the normal gland, and, according to the splendid work of Kendal at the Mayo Clinic, contains more thyroxin. We come to regard it as more volatile, more pungent, and more penetrating. It might be argued that the product of a toxic goitre differs so much in these particulars from that of the normal gland that its toxicity depends on the difference. It is not unreasonable to suppose that because of its volatile and penetrating character it is carried away much more rapidly by the lymphatics, but this is not found to be so. We are convinced that the whole trouble results from the actual hyperactivity where every acini has been

put under a rapid fire too great to permit of the usual admixture of such amounts of albumin and globulin as are necessary in establishing the normal consistency of the finished product."

Not satisfied with the end results of his own work on goitre of this group, he reviews the world's literature on the subject in hope of finding means of establishing some definite cause. His closing paragraph bespeaks his disappointment — he says: "The cause of toxic goitre is not known, nor is it known that the whole cause had to do with the thyroid gland.

"Experience, however, assures us that lobectomy is the treatment capable of the best results, but to attain these results early operation should be regarded as imperative." [Author's Abstract.]

Brooks, H. Physiologic Hyperthyroidism. [Endocrinology, March, 1920.]

Brooks points out that a condition may exist under which symptoms of thyroid disturbance appear, symptoms mistakenly regarded as indicating serious and permanent disease, and that in such cases treatment should not be directed to prevent or circumvent these efforts on the part of the gland, but to direct or guide nature's efforts. It is unwise to attempt measures, and particularly radical measures, which inflict changes or limitations of a permanent character on the gland. There are many conditions which, particularly in youth, are met only by an active secretion on the part of the thyroid; in fact, very many of the so-called youthful characteristics are really manifestations of thyroid activity. The tachycardia of the pronounced hyperthyroid patient is represented in the physiologic hyperthyroidism stage by palpitation. The physiologic demand for an increased thyroid secretion is often met by an increase in the size as well as in the activity of this gland, and in most instances this is induced by a hypertrophy or hyperplasia, as well as by a mere hypersecretion of the gland. The large and prominent thyroid is typical of the mentality and emotional side of both boy and girl toward the development of sex characters and full maturity. The more charming the young woman, the more virile and attractive the youth, the more constantly will it be found that a large gland is present and the more certainly will it be noted that, under normal conditions, such a person responds to emotional and mental stimuli with a quick, aggressive and appropriate reaction. Still another physiologic evidence of thyroid activity or over-activity in the youth is an increased demand and utilization of food. Again at this time, artistic perceptions are most keen. All these traits are dependent, at least to a considerable extent, on a certain degree of thyroid flexibility and over-activity. Periods of great emotional output are accompanied by enlargements, though perhaps temporary, of the thyroid. The tremor, characteristic of both the hyperthyroid and the enthusiast, may be present, and even

exophthalmus may become evident or accentuated. Surgical or other medical treatment is not indicated. Failure to comprehend and correctly manage these cases leads to exophthalmic goitre, neurasthenia or eventually nervous and physical inadequacy. [J. A. M. A.]

Verger, H. Myxedematoid Pains in the Legs. [Journal de Med. de Bordeaux, September 25, 1920. J. A. M. A.].

Verger refers to pains accompanying changes in the skin suggesting myxedema. Both are inclined to be chronic, the pains in leg, knee or thigh coming on during walking and standing, but sometimes also during repose, but they are never paroxysmal. Rheumatism or internal varices is the usual diagnosis; analgesics by the mouth have little or no effect. Rubbing aggravates the pains, the elastic stockings cannot be borne. The pains are usually bilateral but may suggest sciatica on one side. There is tenderness on the back of the thigh, at the bend of the knee and at the ankle, and Lasègue's sign is positive. The skin and subcutaneous tissue are the seat of the pain, not the path of the nerve. The patients have always been females, and the pain on squeezing a fold in the skin differentiates the type. The differential diagnosis is confirmed by the success of endocrine therapy, especially thyroid treatment. It has to be long and persevering, but the benefit from it far surpasses that from any other treatment tried to date. Among his patients was one woman of 45 with this left pseudosciatica and pronounced myxedematous state which had developed six months before. No benefit was apparent under thyroid treatment until after seven months, but in five months more she was completely cured. He gives it for twenty days each month.

Baar, H. Macrogenitosomia Praecox. [Zeitschrift für Kinderheilkunde, 1920, 27, Nos. 3-4.]

This interesting case history of a girl of 3 who was 8 inches taller than other children of her age and the external genital organs were unusually large, and covered with hair. She had an epithelial cancer of the left suprarenal. The author reports this as the twentieth case of suprarenal tumor with macrogenitosomia praecox confirmed by necropsy. There were only three boys in the list. In Baar's case there was a slight cerebellar ataxia, which with the exceptional size of the external genitals and her general precocious development, suggested pineal gland involvement. All previous known cases were in males. Baar compares this case with the literature on pathology of the pineal gland.

Businco, A. Cystic Neuroglioma of Pineal Gland. [Tumori, August 31, 1920.]

Businco says that the case described is the fourth to be published. He cites literature and gives photomicrographs of the growth. It was found at necropsy of a woman who had died from pneumonia, and there

did not seem to have been any pathologic influence or special symptoms from the tumor except those from mechanical compression. [J. A. M. A.].

Borchers, E. Postoperative Tetany and Parathyroid Grafts. [Zentrablatt für Chirurgie, March 27, 1920.]

The operation of grafting parathyroids in postoperative tetany has frequently been successful. The author adds two more cases to those in which parathyroid grafts have been successful. He states that it is unfortunate that ten years ago many surgeons, on the basis of animal experimentation, reached the conclusion that the transplantation of parathyroid glands from one person to another in treatment of tetany was useless. Many authors had shown by animal experiments that the transplanted glands would not preserve their structure and function, but in man the glands, as can now be shown by a whole series of cases extending over several years, do preserve their structure and function, or at least a structure and function that protects. Animals behave functionally different from humans, which laboratory zealots must learn.

Brown, A., MacLachlan, I. F., Simpson, R. Calcium in Tetany. [Am. Journ. of Diseases of Child, June, 1920. J. A. M. A.].

Constitutional reactions were produced following intravenous injection of calcium lactate in 1.25 gm. doses in nine patients observed by Byfield and his associates. The degree of reaction varied from a slight drowsiness to almost complete collapse accompanied by dyspnea. The signs of reaction disappeared usually between one and seven hours; the more severe the reaction the longer it took the patient to recover. A temporary absence of both electrical and mechanical signs of tetany, usually lasting from seven to ten hours was noted. Apparently no beneficial therapeutic effect was exerted, unless this was supplemented by the administration of cod liver oil and phosphorus, and in this instance the reduction of the tetanoid symptoms is a little more rapid than with the employment of cod liver oil and phosphorus alone. Cod liver oil and phosphorus produced an increase in the blood calcium with a corresponding reduction in the mechanical and electrical signs, within a period of from ten to seventeen days.

Stheeman, H. A., and Arntzenius, A. K. W. Signs of Calcium Deficit. [Neder. Tijdschrift, March 27, 1920, 1 No. 13. J. A. M. A.].

Stheeman is chief of the children's hospital at 's Gravenhage and his long and extensive experience has convinced him that a large number of pathologic conditions have the one feature in common of an inadequate reserve of calcium. This *calcipriva stigma* is the underlying cause responsible for spasmophilia, for the habitus asthenicus, universal asthe-

nia and allied conditions. That this fact has not been fully appreciated before is due to the lack of a simple and reliable quantitative test for the calcium content of the blood. Wright's method reveals only the calcium that is dissolved, and there is no standard for camparison between the findings by different workers. The DeWaard method of microtitration with one-hundredth normal solution of potassium permanganate gives reliable findings with as little as 0.5 or 1 c.c. of blood or serum. The findings in the blood serum of thirty-five sick children and in a number of healthy children and a few sick and healthy adults are tabulated. In the fifty-eight healthy children the calcium content was constantly between 12 and 13 mg. per 100 c.c. of serum. In the others it ranged from 8.25 to 17 mg. The age does not seem to influence the calcium content, but an extremely low figure was found in the prerachitic condition, with intestinal infantilism, neuroses of the vegetative nervous system, universal asthenia, and tuberculosis. The severity of the pathologic condition was reflected in the lowness of the calcium content, and the figure rose as the general condition improved. A further proof of his theory is the prompt benefit in all these pathologic conditions when treatment aiming to promote retention of calcium, namely, with cod liver oil and phosphorus, was systematically given. To estimate the improvement, he does not trust to personal impressions but measures it with precision by testing the sensitiveness of the peripheral nerves to the galvanic current. This has confirmed that the Erb sign is nearly always positive with a low calcium content and is never positive with a high content (aside from rachitis). Also that the Erb sign is most pronounced, the greater the deficit in calcium, and that as the Erb sign becomes less pronounced, the calcium content is also found to be increasing. It seems thus beyond question, he concludes, that the cause is a local calciprivic condition of the nerve tissue, at least in the peripheral neuron, as a part of a general deficit of calcium in the tissues. It conforms to Quest's and McCallum's findings in dogs, and to the Chvostek sign in children. The latter he regards as a more sensitive sign than the Erb reaction.

Rossi, S. C. Influenza, Suprarenal Insufficiency and Manic-Depressive Psychoses. [Anales de la Faculad de Med., Montevideo, December, 1919, 4 No. 12.]

It has been observed not infrequently that psychoses of a depressive type develop after influenza. Rossi has encountered nine such cases in which a diagnosis of manic-depressive psychosis was made. He ascribes it to the suprarenal insufficiency which was manifest. This assumption was confirmed by evidences of suprarenal insufficiency in six other patients with manic-depressive psychoses who had not had influenza. It was placed on a still more solid basis by the efficacy of suprarenal treatment. He is optimistic about the use of epinephrin, but

apparently is unaware of its almost total failure in pronounced manic-depressive psychoses as reported by others.

Bruening. Removal of Suprarenal Capsules for Epilepsy. [Zentralbl. f. Chir., October, 1920.]

The removal of the suprarenal capsule has been shown to diminish susceptibility to convulsions and reduces muscle tonus. Fischer, who has extensively experimented, believes that the somatic nervous system plays only a subsidiary rôle in epilepsy, the vegetative nervous system being of prime importance. This would explain the ill-success which has attended operations on the brain. Bruening, with Fischer's work in his mind, has applied the principles to man and has excised the left suprarenal capsule from nine patients suffering from epilepsy. He describes the technique in some detail. The organ is approached by the abdominal route. The left adrenal is that chosen because, although the right lies lower, there is danger of wounding the biliary passages or tearing the liver. Bruening makes for the lower border of the pancreatic tail after pulling the colon well down and perhaps mobilizing the splenic flexure. The kidney is depressed and the fatty capsule dissected from the suprarenal, which is removed after picking up its vessels. Drainage is only instituted if halemostasis has not been satisfactory. All the patients recovered from the operation. The dissection is a deep one, and long instruments are necessary. In two cases, where fits were a daily occurrence, there have been no further convulsions. In all the others there was improvement, sometimes a very great improvement. Bruening is encouraged by this method of treatment. The cases were unselected, and one at least (an old encephalitis) was unsuitable for operation. He believes that the best time for interference is after puberty, when growth is finally slowing down. His two successes were in patients aged respectively 18 and 21 years. He admits that this question of the influence of the sympathetic system on the brain is in its infancy, and contemplates the necessity for removal of the right suprarenal as well. Accessory adrenals and compensatory hypertrophy of the remaining adrenal tissue are possible causes of failure which require investigation.

Gavazzeni, S. Two Cases of Pituitary Tumor with Acromegalic Syndrome Cured by X-rays. [Radiol. Med., 1920.]

One case had the complete clinical picture of acromegaly, and radiographically showed evidence of pituitary tumor. The symptoms of discase were of four years' standing, but the condition improved very much under X-ray treatment. The other case showed the same symptoms and signs in a milder degree, and the results of radiotherapy were equally good.

Reichmann, V. Pituitary Tumors. [Deut. Archiv. für Klin. Med. September 26, 1919.]

Reichmann reports two cases in which the symptoms had suggested exophthalmic goiter, tendency to acromegaly, suprarenal disease, and disease of the genital glands, but necropsy revealed in the woman of 36 an eosinophil adenoma in the pituitary, and in the man of 51 the roentgen findings seem to indicate a similar tumor. The face was red and puffy in both; the exophthalmos was pronounced but the thyroid was not enlarged, and the pulse was slow, with extreme weakness of muscles, emaciation, edema of the legs, slight glycosuria, no albuminuria, and no signs of contracted kidney, but the blood pressure was very high, and there was pronounced osteoporosis of the spine. The symptoms thus indicated excessive functioning of the pituitary and suprarenals, with thyroid deficiency. The curvature of the spine from the osteoporosis was evidently responsible for the severe neuralgiform pains in the back in the woman's case. Tests for epinephrin in her blood were negative, but the blood pressure of 200 mm. mercury pointed to the suprarenals, and as the pains in the back were unbearable, Reichmann yielded to the patient's demand for operative relief, and removed the left suprarenal. The woman died nine days later from peritonitis, nearly three years from the first onset of symptoms, which had been edema of the legs, exophthalmos and arrest of menstruation. The latter had never been constantly regular. [J. A. M. A.].

Jaugeas. New Contribution to the Radiotherapy of Pituitary Tumors [Jourl. de radiol. et d'électrol, 1919.]

No affection enables one to judge of the deep action of X-rays, to control their efficacy, and to appreciate the value of technique better than the above-mentioned, thanks to the measurable variations in the patient's field of vision. The author quotes observations on a woman of 25 presenting the classic symptoms of pituitary tumor with acromegaly. Radiography of the skull showed almost entire destruction of the sella turcica, a breaking-up of the floor of the cavity with opening of the sphenoidal sinuses. Disorder of vision first attracted her attention; an oculist advised recourse to radiotherapy. Twenty séances produced a very marked improvement in the condition of the sight. Examination of the visual region showed a temporal hemianopsia on the left side and a hemianopsic scotoma on the right. Radiotherapy was continued two years, employing two temporal and two frontal portals of entry for the rays, each of which received 50 H. every fortnight of a penetrating irradiation, filtered at first by 2 mm., then by 4 mm. aluminum. Improvement began from the first months of treatment. The scotoma disappeared; the two visual regions extended; visual acuity improved and became nearly normal. At the same time the general condition of the patient improved and she soon regained her intellectual activity. The

improvement obtained might be considered as nothing more than an immediate and temporary effect of the radiotherapy, were it not that an older observation, in which the beneficent effect lasted for six years, permits one in this case to speak of a cure. Treatment should always be begun early, when the syndrome of glandular hyperactivity is manifesting itself. It should be conducted with care, so as to preserve a sufficient functional value of the gland and to avoid production of a syndrome of insufficiency in place of that of hyperactivity, such as occurs in exophthalmic goiter. The visual field should serve as guide during progress of treatment. [Medical Science.]

A. Priesel. Hypophyseal Dwarfism. [Ziegler's Beitr., Bd. 67, H. 2, 1920.]

According to Hansemann's rather formal classification the proportionate dwarfs are to be separated in primordial and infantile ones. From those who belong to the infantile type only a few show alterations of the pituitary body; so pituitary nanosomnia is a destructive result of glandular part of the pituitary by tumors or some other pathological proceedings occurring before completed lengthgrowths of the body.

The author's case was a man, 91 years old, who died of lobular pneumonia, measured only 132 cm, but without manifesting any disproportionalities and had stopped growing with 15 years. He never gave evidence of any pathological mental trouble, but was beardless and showed no hairgrowth in axillary and genital region. General obesity, external genitals small. The skeleton bones were developed like those of adults (well marked and characteristic plastic bone-surface); united epiphyses. The trouble in growth seemed to have been the result from some anomaly in the development of the pituitary body. The neurohypophysis was found outside the sella turcica beneath the tuber cinereum and was communicating with the glandular part only by a tissue-band from 0.5 mm. The parenchym of the anterior lobe was lining as a thin membranous stratum the sella turcica and also a cavernous space from hazelnut size in the sphenoid, which largely communicated with the bottom of the sella and had no connection with the sinus sphenoidalis itself. A canalis craniopharyngeus was leading vertically through the cranium from the ground of the mentioned cavern and was appearing behind the vomer. Histologically the nervous part of pituitary was found without any alterations, while the glandular tissue, compressed as mentioned to 0.2 mm., was atrophic and showed only ungranulated cells, being in its whole extent not even so large as the pituitary of a child of 15 years.

The cause of the anomaly seemed to have been an ossification trouble of the sphenoid, perhaps through persistence of the canalis craniopharyngeus. The extent lost of glandular parenchym is probably connected with perturbed blood circulation brought up by the abnormal rari-

fication of the continuity between both parts of the gland. The transposition of the neurohypophysis beneath the tuber cinereum might be regarded as an autonomous anomaly without any other trouble in the development that could be proved in a second case of the author.

The parathyroids showed hyperplastic alterations which were hitherto not yet seen associated with nanosomia, the more no sign of osteomalacia could be found. The thyroid gland was senile, atrophic, the adrenals rather reduced in size. The testes, also atrophic, Leydig's cells were not to be found. The atrophy of germinal glands probably occurred in an early time of age, brought up by disfunction of the pituitary and being the cause of eunuchised fat-disposition.

The alteration of the pituitary body, the stopping of growth at 15 years, and the infantile proportions of the skeleton bones, yet the epiphyses were all united, are proof that the case is belonging to the type of infantile nanosomia. Basing on the anatomical substratum of the case, the author is glad to admit that the atrophy of glandular part of pituitary gland only gradually took place, by which probably at first only the cartilaginous growths were stopped; meanwhile the further ossification was going on regularly, leading to the uniting of epiphyses. [Author's Abstract.]

Barthlemy, R. Inherited Syphilis of the Endocrine System. [Thése, Paris, 1919.]

The heredosyphilitic septicemia (intra-uterine or not) reaches the endocrine system as well as the other organs. Pathologic anatomy and histology prove it. Clinically, the Wassermann reaction and the results of the antisyphilitic treatment, associated or not with ortherapy, confirm it, chiefly in the pluriglandular syndromes where the attack is rather superficial, fragmentary and curable.

But apart from this, certain endocrine manifestations are bony, dental, and trophic troubles which we find precisely again in the dystrophic inherited syphilis (gigantism, dwarfishism, infantilism, etc.) It seems that these consequences could be averted by sufficiently precocious treatment.

Other troubles, athrepsy, weakness (Dr. A. Fournier) often come from a touch, at least histologic, of the endocrine organs. Lastly, there exist phenomena still more delicate. Why do so many heredosyphilitics become chlorotic at puberty? Why did Pel's patient become acromegalic in consequence of a traumatism of the skull? Why do certain heredosyphilitics die or present a glandular syndrom in consequence of a very slight infection which does not ordinarily attack a normal organism?

Here is found a biopathologic susceptibility of the glands, which produces an unstable balance which will prove fatal under the influence of a cause that would not even affect an ordinary person. In these

cases treatment may be efficacious. Similar cases may be seen among the heredosyphilitics of the third generation; sometimes it is the cause of certain mental troubles (instability of character, inattention, etc.) With these very often the specific treatment does not act. This is the reason why some try to explain these facts by a toxemic inherited syphilis. In reality this gives less transmission of a syphilitic toxine than transmission of a bad glandular function; for these, opotherapy may be efficacious. For example: If a grandson does not inherit the treponema at least he does the endocrine lesion or the trouble of secretion. (Similar heritance of an exopthalmic Wen.) Maranon has seen analogous facts outside of syphilitics. Then, all degrees exist, from the massive and mortal lesions where swarms the treponem to the purely secretory insufficiencies which may long remain latent. So is explained the origin of heredosyphilitic dystrophies, when the trephonemea does not act by itself and locally there exist among the children of heredosyphilitics troubles which the antisyphilitic treatment is powerless to correct. Here the inheritance is not the syphilitic but the glandular insufficiency that may effect all descendants. The first conditions are helped by all the above means, the second by opotherapy, but even this is powerless upon the definite dystrophic. [Author's Abstract.]

II. SOMATIC SENSORI-MOTOR NEUROLOGY.

4. MID BRAIN-CEREBELLUM.

Durand. ENCEPHALITIS LETHARGICA. [Riforma Med. 1920.]

The bacterioscopic and ultra-microscopic examinations of blood and cerebrospinaal fluid from cases of lethargic encephalitis were constantly attended by negative results. Subcutaneous and intravenous inoculations of blood and cerebrospinal fluid into rabbits, guinea-pigs, and white mice were also entirely unsuccessful. Culture from the cerebrospinal fluid remained sterile. Bouillon culture from the blood of four out of six different cases allowed the author to isolate a very small Gram-positive coccus, of which he describes the biological properties, without, however, considering it as the specific agent of the malady. This because, in severe disease of infectious origin, the blood may be invaded either by the specific germ localized before in a certain organ, or by other germs merely complicating the morbid process without being directly connected with its causation.

Roger, Henri. ACUTE EPIDEMIC ENCEPHALITIS: THE LETHARGIC, MYOCLONIC, CHOREO-ATAXIC, DELIRIOUS AND NEURALGIC TYPES. [Marseilles Medical, April 15, May 1, and June 15, 1920.]

This paper, read at the meetings in February and April, 1920, of the Comité Medical des Bouches-du-Rhone, gives a review of the French and foreign work on epidemic encephalitis up to this time, and also

gives the author's view of several of the points, as well as detailed personal observations in fifteen new cases. The classical symptoms of the lethargic form are described briefly, with emphasis on the "negative symptoms," absence of clinical signs relating to the meninges, and negative laboratory findings, blood culture, Wassermann, etc. He takes exception to the opinion prevalent at that time that there is no cytological or chemical meningeal reaction, and calls attention to two signs which are so constant as to be almost pathognomonic: the parkinsonian syndrome (mask-like facial expression, cataleptoid attitudes and tremors continuing with the limbs at rest), and paralysis of the ocular accomodation. This is often present in the early stage, and is usually persistent.

The other types of epidemic encephalitis fall into four groups:

1. *The myoclonic* type, characterized by pain and sudden muscular spasms. Hence Roger suggests calling this type *algo-myoclonic.* This form may be local or general (affecting the abdomen and diaphragm, as in epidemic hiccough). In a previous communication (Le Journal des Praticiens, May 8 and 15, 1920), Roger has given a detailed description of this type. In the present paper he reports interesting cases seen at Salonika ambulatory at the onset, in which the salient features were paralysis of the median and ulnar nerves, perpura of the upper extremities, and grave constitutional disturbances.

2. The *choreo-ataxic* type, in which the contractions are less abrupt, but lasting longer than in the myoclonic type, and are accompanied by insomnia and delirium. He mentions one severe case attacking a patient 15 years of age, and proving fatal in four days.

3. The *delirious* type. These cases were referred to the psychopathic ward.

4. The *neuralgic* type.

Roger insists that all these types have an identical causation. The two most frequent forms, the oculo-lethargic and the algo-myoclonic — in their pure forms the exact opposite of one another — present enough facts, anatomical-pathological, semiological, or symptoms apparently of the other type appearing during the course of the disease, to confirm this theory of their common origin. Roger reports cases of pure lethargic encephalitis ushered in by myoclonic spasms during the period of somnolence, other cases with localized myoclonic sequellae, and some cases with algo-myoclonic syndrome preceding the typical lethargic encephalitis.

While insisting upon the polymorphism of epidemic encephalitis, Roger attempts, in order to clarify the picture of its multiple clinical types, a classification based upon the particular functions of the nervous system involved, and to distinguish in each group those functional disturbances due to hyper, or hypoactivity, or to derangement of function, as hyper, hypo and para.

1. *Motor form.* Hyper: myoclonic, choro-ataxic, choreic, tetanic and convulsive. Hypo: paralytic, paraplegic and polyneuritic. Para: Parkinson type.

2. *Sensory* form. Hyperalgic form.

3. *Psychic* form. Hyperdelirious, mental. Hypo: mental depression.

4. Affecting the sleep function. Hyper: somnolence. Hypo: insomnia.

The pathology is extensively considered. The hypothesis of the non-specific origin of encephalitis is discarded, as he cannot agree with those writers who consider encephalitis a syndrome affecting various portions of the central nervous system — usually the peduncle — but due to divers causes, either infections, as tuberculosis, syphilis, influenza, poliomyelitis, or intoxications, as botulism. Encephalitis may of course occur in syphilis, without any causal relation between the two diseases, as in two cases which he reports with negative Wasserman of the blood and spinal fluids. The influenzal origin of encephalitis is accepted by some writers on the ground that epidemics of influenza and encephalitis occur close together, as in 1889 and 1890, and that the respiratory organs are rarely involved, but Roger does not hold this view. The difference in the clinical characteristics of influenza affecting the nervous system and encephalitis, in their anatomical lesions, and in their mode of transmission lead Roger to regard them as two distinct infections. He also believes that encephalitis is due to some specific organism and bases this upon (1) the anatomical lesions, which he discusses with special reference to the histological type, and to their sites; (2) the epidemiological and etiological facts known, and to the (3) experimental researches of American and French authors concerning the virus.

Roger, then, believes that the morphology of epidemic encephalitis is due, not to any variations in the virus, but to predominance of the lesions in certain sections of the mesocephalus or the neuraxis producing the various clinical types, the oculo-lethargic, choreic or the parkinsonian syndrome. He does not deny the possible myelitic origin of certain myoclonic movements, but he describes certain features of alternate hemimyoclonia which favor the bulbo-protuberal origin of the algo-myoclonic syndrome. [Author's Abstract.]

Sala, G. Histo-Pathological Observations on the Ciliary Ganglion in Cases of Lethargic Encephalitis [Boll d. Soc. Med-chir. di Pavia., 1920, 33, 93.]

Investigations were made by Cajal's reduced silver method on the ciliary ganglion from cases of lethargic encephalitis which had presented during life various pupillary troubles. Some ganglion cells no longer showed their characteristic structure and appeared transformed into an

irregular protoplasmic mass containing many small and roundish bodies stained black by the reduced silver. The author puts forward the suggestion that they may be granules of pigment but with characters somewhat different from those one finds in normal spinal and sympathetic ganglion-cells. Sala's observations remind one very much of the pigment-like granules described by Da Fano and Ingleby (Proc. R. Soc. Med., 1919, 12, [Sect. of Path.], 42), also in cases of lethargic encephalitis and in places of the central nervous system where brown or black pigment does not generally occur. [Medical Science.]

Bramwell, E. Lethargic Encephalitis. [Lancet, May 22, 1920, 1, No. 5047. J. A. M. A.]

The material forming the basis of the pathologic inquiry made by Bramwell consisted of five fatal cases. He found (1) hemorrhage rare; (2) edema of the nerve tissue; (3) proliferation of neuroglia, and (4) infiltration of nerve tissue and perivascular lymph sheath with cells, usually lymphocytelike in type. These changes were seen most strikingly in the ventral portion of the pons, especially in the region of the substantia nigra, implicating the fibers of the third nerve as they pass out, and thus accounting for one of the common symptoms of the disease. In no case were any organisms, or bodies suggesting organisms, seen.

Claude, H. Myotonic Form of Lethargic Encephalitis. [Bull. et Mém. Soc. Med. des Hôp. de Paris, March 4, 1920.]

Three cases of a myotonic form of lethargic encephalitis are here recorded in which the patients showed changes of muscular tonus independently of any involvement of the pyramidal system. In two cases the physiognomy was absolutely expressionless, although somnolence was not a pronounced feature. On attempting to move the limbs considerable muscular rigidity was encountered. One of the patients resembled a case of paralysis agitans owing to his mask-like expression, muscular rigidity, and tremor of the hands. Claude suggests that the peculiar appearance presented by the patients was due to changes in the locus niger.

Netter, A. Treatment of Epidemic Encephalitis. [Bul. de l'Académie de Méd., March 30, 1920, 83, No. 13.]

Netter comments on the analogy between this disease and epidemic poliomyelitis, although they are separate entities. Treatment along the same lines is indicated for both, that is, intraspinal injection of convalescents' serum for its specific, and hexamethylenamin for its general bactericidal action, with a fixation abscess to reenforce the natural defensive forces. However, he says, the time has not come yet for intraspinal serotherapy as the presence in the blood of antibodies neutralizing

the virus has not yet been demonstrated with the encephalitis, as it has been demonstrated for poliomyelitis. Another reason is that the virus is in the nerve centers only for a brief period in poliomyelitis, while this may keep up for three months in the epidemic encephalitis, and we do not know how early it appears in the blood in the latter. He gives the hexamethylenamin by the mouth in fractioned doses in treatment of all meningitic conditions and poliomyelitis, and commends it for epidemic encephalitis although not absolutely certain of its efficacy as yet. He knows of a case in which arsphenamin treatment was tried with disastrous effect. On the other hand, jaborandi or pilocarpin seems to aid by promoting elimination of the virus through the saliva as in rabies; in 4 of his 72 cases the salivary glands were swollen, and exaggerated salivation was manifest in a number of others. He gives epinephrin with the jaborandi to counteract its depressing effect. In the 27 patients treated with injection of 1 c.c. of turpentine, an abscess developed in 19 and all these recovered except one pregnant woman. In 13 of the cases the condition was so grave that hope had been abandoned. In 14 of the 19 cases reacting with abscess production, the encephalitis was of the myoclonia type. In 25 grave cases in which no attempt had been made to induce the fixation abscess, more than 50 per cent. died. Hippocrates noted that those who escaped the "lethargus" were generally those who had developed a suppurative process, and when Fochier applied the turpentine abscess as a therapeutic measure, he explained its efficacy by its attracting the virus to the spot. Netter ascribes it to a stimulating action on the organs which provide the natural means of defense; myelocytes appear in the blood, demonstrating the participation of the bone marrow. It is probably, he remarks, by a similar mechanism, that vaccines, serums and nucleinates exert their action. Another patient with extremely grave epidemic encephalitis recovered after the development of a spontaneous deep abscess in the buttock. [J. A. M. A.]

Bastai, P. On the Aetiology of Lethargic Encephalitis. [Gazz. d. osp., 1920.]

The author, after having briefly reviewed the opinion expressed by other investigators on the aetiology of encephalitis lethargica, puts forward the suggestion that its different clinical forms may be due to the presence in the tissues of various germs of different pathogenic power, perhaps associated with an as yet unknown specific virus.

Tron, G. Lethargic Encephalitis: Its Possible Relation with Mixed Infections. [Gazz. d. osp., 1920.]

Summary of a communication made at the "Accademia Medico-Fisica di Firenze," April, 1920. Seven rats were inoculated intraspinally with the filtered emulsion of three human brains from typical cases of lethargic encephalitis. The animals soon became affected by a disease chiefly

characterized by lethargy, from which, however, they recovered in about 8 days. At the microscopic examination of the brains small perivascular haemorrhages and a moderate small-celled infiltration of the brain substance were found. The same facts were noticed in the walls of the cerebral ventricles, together with a more remarkable lymphocytosis of the cerebral spinal fluid. From cultures made from the filtered emulsions either of human or cat's brain a very small coccus was isolated. The author, therefore, is of the opinion that the specific agent of lethargic encephalitis may belong to the group of filter-passing cocci.

At the same meeting of the above-mentioned Academy, Pisani and Varisco made a communication regarding their isolation from other cases of encephalitis of a diplococcus different in certain respects from all known diplococci. In the opinion of the authors, however, their diplococcus is only a germ frequently associated with the still unknown specific agent of the disease. [Medical Science.]

III. SYMBOLIC NEUROLOGY.

1. PSYCHOLOGY — NEUROSES — PSYCHONEUROSES.

Freimark, H. Eroticism and Spiritualism. [Internat. Ztschf. f. aertz. Psychoanalyse. Vol. III, No. 5.]

A careful psychoanalytic study of clairvoyancy clearly reveals the erotic origin of the manifestations. Following the principle that every thought tends to assume a form (James), the medium who is unable to give her thoughts form through art embodies them in dream figures. The conduct of mediums in their trances is described to show its visible resemblance to erotic excitement. In their essential nature the physical and intellectual manifestations are identical, only differing in the form of expression given them. In confirmation the evidently sexual nature of the manifestations in Mesmer's experiments is cited. The view that the instinct of reproduction, i. e., the instinct to create tends to phychic creation if its physical development be hindered, cannot be given too much emphasis, the author avers, and it may be remarked that the talent of female artists is found to develop after some resistance, internal or external, to the expression of the maternal instinct had been encountered. Artistic activity springs from the same source as that of the artist, but in the artist it finds expression at a higher level. For both direction and concentration of energy are important. The medium is able to divert the energy which would otherwise pass into the organs of the body, into the psyche. This form of creation exercises a very great influence on the destiny of mankind and to a certain extent each individual is dependent on a similar but less marked development of his own psychic aspirations, which become symbolic in some form or other. A striking characteristic of mediums is their wish to belong to a higher sphere of life than that in which their lot is cast. Their controlling spirits bear celebrated names, or appear surrounded by glory, they are

Egyptian or Indian royalties, even deity itself approaches them. The medium only represents those aspirations common to all mankind in an exaggerated manner.

In this connection the author refers to the conception of Paracelsus, namely, that the world creates us and that we project into the world elements of our own, those treasures of hopes, beliefs, and wishes upon which the heart hangs. The scientist should not overlook the deep shadows from which these faint gleams of light stream forth. His endeavor should be to free man from the arbitrary vacillations of the unconsciousism, from a subjection to individual dreams and elevate him to a realization of the general trend of life revealed in prospective tendencies.

Freud, S. Methods of Psychoanalytic Therapy. [Intern. Zeitschf. f. a. Psychoanalyse, V. No. 2.]

This article is an address delivered at Buda Pesth in September, 1918, in which Freud gives a summary of the past successes and a forecast of the future prospects of psychoanalysis. Psychoanalysis, he says, has been successful in discovering the unconscious resistances at the root of the neuroses, in bringing these fully to consciousness, and, making use of the transference to the physician, in securing normal adjustments of neurotic conflicts. The name, psychoanalysis, was originally used because of the analogy of the process of separating the soul into its elements with the chemical process by which material substances are separated into their elements. In some quarters the success of this process has suggested the possibility of carrying the analogy still further, and the attempt has been made, after the analysis, to build up the character in a manner which was supposed to resemble chemical synthesis. It has been claimed that this is the direction which the future development of psychoanalysis must take and the cry was raised that there could be too much analysis and not enough synthesis. Such attempts at synthesis, says Freud, are as senseless as would the attempt to resurrect an animal organism after its destruction by vivisection.

The future advances of psychoanalysis must be made in an entirely different direction, he asserts — in the direction of "active therapy," referred to by Ferenczi in his article on the technical difficulties of an analysis of hysteria.

Freud indicates what may be understood by the term "active therapy." If the activity of the analyst results in making conscious what was repressed and in discovering the resistances, it has already been considerable. Further questions, nevertheless, arise: Shall the patient be left to battle alone with the resistances laid bare by the analysis? Should more specific aid be given him than is contained in the encouragement to get well and the transference? Does it devolve upon the physician to help the patient to that psychic position which is

the most favorable for accomplishing the desired result — the allaying of the conflict? If the patient's recovery depends on the solution of external difficulties is it the province of the physician to so far enter into the struggle as to adapt these circumstances to the patient's victory? Freud's answer is that activity in aid of the patient is beyond all doubt justified, and he adds that the fundamental principle which should here guide the physician is that the cure must be carried out as far as possible in abstinence on the part of the patient — not total abstinence from satisfaction, which would, perhaps, be impossible; not abstinence in the popular sense of sexual continence, but abstinence of a sort more intimately connected with the dynamics of the disease and more important for the cure. It was renunciation which gave rise to the disorder and the symptoms are substitutes for satisfaction. For complete cure a very strong desire for cure is indispensable. It may be that, if the symptoms are too quickly ameliorated, this desire may be weakened. Here the physician should interfere to prevent a premature diminution of the suffering which is at the root of the wish to be restored to health, and if the symptoms disappear too rapidly he should create unsatisfied wants in other directions which will give energy to the desire for complete health.

Danger of such premature amelioration of symptoms is threatened from two directions. The libido in part set free by the analysis, may become engaged in devious substitute satisfactions, in activities which perhaps previously existed but which are now endowed with strong emotional energy. The patient constantly engaged in these diversions is no longer stimulated by the desire to get well. A half-cured patient, for example, may enter prematurely into relations with a woman who is not adapted to him, with the result that an unhappy marriage is contracted. It is the physician's duty to prevent such substitute adjustments, if possible.

It is harder for him to interfere in situations of the second class, namely, where the patient's desire for cure is weakened by reason of the transference to the physician. Such a transference is a real hindrance to the success of the therapy and should be avoided. Freud says that it has been his invariable custom to refuse to make of his patients close adherents and followers and to impose on them his ideals. This was one of the points which gave rise to the controversy between him and the Swiss school, and though at the time he had the impression that some of his friends, among them Jones, thought this refusal harsh and arbitrary, he is nevertheless convinced that he is in the right. He is also unable to accept the suggestion of Putnam that psychoanalysis might be offered to the patient as a philosophic viewpoint which would lend content and meaning to life and ennoble the character. An expedient of this sort, Freud asserts, is only force in disguised form.

Experience has particularly emphasized the necessity of adapting "activity" in the analysis to individual differences in the cases. The

physician would have little success in overcoming phobias if he made no attempt to free the patients from their fears until they voluntarily gave them up as a result of the analysis. In this way he would never be able to bring the material into the analysis, the discovery of which is indispensable for the cure. Taking agoraphobia as an example, he states that the patient should be induced to go among people in the street — to actually strive against the fear — and in the course of this effort the memories and ideas are revived which render the solution of the patient's problem possible. Passive waiting seems still less indicated in severe compulsion neuroses. The tendency of this disease is, in general, toward indefinite prolongation of the treatment, as it were toward "asymptotic" treatment; the analysis brings much to consciousness, but fails in affecting changes. The proper technique is to make the desire for cure so strong that it becomes itself a compulsion, and then to oppose this compulsion to the pathological one.

The author offers these cases only as examples of the problems with which the analysis is at the present time confronted. In closing his address, he expresses the hope that the use of psychotherapy may be extended in such manner that the mass of the people, among whom psychoneuroses are so prevalent, may be benefited thereby. [C. Willard.]

Jones, E. Anal Erotic Traits of Character. [Internat. Zeitschift. f. a. Psychoanalyse, 1919, V. No. 2.]

In this article, which has appeared in English in the Journal of Abnormal Psychology, Vol. XIII, and also in Jones' "Papers on Psychoanalysis," 2d edition, the author gives the following summary: At the root of the anal erotic processes is either the tendency to "retain" or to "yield," and from each of these is derived a separate series of characteristics. Every hindrance offered to the tendency predominating in the personality is met with opposition leading to deeply stamped character traits in the form of obstinacy, irritability, self-will, and bad temper. Characteristics to which both fundamental tendencies contribute are tenacity, inadaptability, capacity of concentration, with strivings in the direction of thoroughness and perfection.

In the adult the character traits depend principally on the reciprocal relation of the individual attitudes toward the two fundamental phases and the degree in which the individual reacts to each in the process of development and sublimation. Sublimation may lead, on the one hand, to thrift, miserliness, the love of possessing and taking care of things, to a capacity for tenderness as long as the person loved is submissive; or, on the other, to productivity, prodigality, love of creation, an inclination to impose the person's own personality on everyone and everything, a liking for modeling and molding, great pleasure in making presents. Reaction forms are orderliness, cleanliness, pedantry and disinclination to waste.

The final resultants in character are extremely manifold, because of the very complex relations of the anal erotic components among themselves and in combination with other factors. From this complex arises some of the most valuable as well as some of the most unfavorable qualities. Among the first may be included strong individuality, decision, determination, love of order, talent for organization and efficiency, dependability, aesthetic refinement, and tenderness and tact in the affairs of the world.

To the latter belong the inability to be happy, irritability and ill-temper, hypochondria, miserliness, narrowness of soul, limited intellectual vision and wearying spiritual obtuseness, love of domination and stubbornness — all traits which render life in society very bitter and difficult for their unhappy possessor. [C. Willard.]

Reik, Th. Psychoanalytic Theory of the Affects. [Internat. Zeitschift. f. a. Psychoanalyse, Vol. iv, No. 3.]

Observation of human behavior reveals two types, between which lie a whole series of transitional forms which at the same time separate and connect the extremes. In one group we find people who give free play to their emotions and in the other those who do not permit themselves affective outbreaks. In the first class the relaxation of the emotional psychic tension with the outbreak produces a feeling of relief and also a sense of inward strength, about the origin of which there cannot be the slightest doubt. It arises immediately from the consciousness of having preserved the ego from insult, and the root of this feeling is in the satisfaction of the primary narcissism in the unconscious. In illustration, the author gives a concrete example: A is insulted by B and gives vent to his anger in a manner unworthy of a civilized European gentleman — by boxing B's ears. The box on the ear is the obvious expression of the injured narcissism; the elevation of the egoistic feeling is the sign of the restoration of the narcissistic self-esteem. All the psychic adjustments to reality, all the renunciation of passion in the interest of culture, give way in a moment; the man becomes instantly a foolish, self-enamoured child — only playing the "grown-up." We are accustomed to regard the vita sexualis as a paradigm for all other affective experiences, and, therefore, without seeming to exaggerate it may be asserted that this outbreak of elementary affect with narcissistic satisfaction (in part accessible to consciousness) may be likened to the satisfaction which results from sexual congress. That fact that in some instances there is lowering of the egoistic feeling is no argument against this view, for this reaction only sets in later as result of reflection on the possible results of the outburst of passion, and is itself not without narcissistic value, for Freud has shown that the sense of guilt for an emotional outbreak is founded on a conviction of an ideal perfection of the ego, a narcissistic derivative. In this connection the author directs

attention to the feeling of inferiority in neurotics, studied by Adler, stating that the consciousness of inferiority really conceals a hypertrophy of narcissism — a fact which Adler failed to comprehend. If a simile be permissible, it may be said that the behavior of these neurotics is analogous to that of those rich persons who constantly bewail their poverty from fear that their wealth may become known.

The author asserts that repression of affect also produces an elevation of the unconscious narcissistic feeling. Following again the course of events in the concrete example: A is deeply insulted by B. His education as well as his psychic attitude prevent the direct satisfaction of his wishes for vengeance and the instantaneous payment of the injury by word or deed. The depression which is the immediate result of abstinence from motor satisfaction gives rise to a reactive strengthening of the narcissism and in such a situation a compromise is likely to take place. The censor guarding the threshold of consciousness permits the narcissism to reassert itself under a disguise, the verbal expression of which is "such a man could not insult me!" The self-esteem is reestablished through the undervaluation of the opponent. The pleasure in immediate expression of affect after insult is of sadistic origin; that found in renunciation of expression is of maschochistic origin, though even in this latter case there is to a certain extent mobilization of sadistic tendencies. The desire to produce pain, repressed so far as the immediate opponent is concerned, may find expression in a violent protest against the entire cosmic order. The violent expression of the affect may be regarded as a belief in the "all-powerfulness of the deed;" while those who permit themselves no emotional outbreak find satisfaction in belief in the "all-powerfulness of thought." In this substitution of thought for deed, phantasy magnifies the circumstances, giving them a more terrible, more complicated aspect, and the person who represses affect may come to wish to kill his opponent, even with horrible torture; he does not renounce vengeance, he merely postpones it. In the opinion of the author the connection of repression of affect or postponement of its satisfaction with the processes of sexual life is not as yet fully understood, but cases are by no means rare where a man who represses anger against his wife or sweetheart reacts later with ejaculation praecox or impotence. The mills of our emotions grind slowly but they grind exceeding *sure*.

The rôle of shame and its connection with the reluctance to express strong emotion is most interesting. It seems as though the effusion of affect, the pouring forth of wrath bears some essential relation to normal ejaculation and the processes of excretion. The abstinence from effect may be analogous to the pathological, or, at least, abnormal processes in sexual life and excremental processes.

Book Reviews

Winkler, Cornelis. Manuel de Neurologie, Anatomie du Systeme Nerveux. Deuxieme Partie. [De Erven F. Bohn, Harlem.]

This is the seventh volume of Winkler's collected works and is new, constituting the second part of his anatomy of the nervous system which is incorporated in Vol. I of his Manual of Neurology. We have had occasion to speak of the first volume of this Manual as the most comprehensive and thorough work on the anatomy of the nervous system of man as applied to practical neurological problems that we have. We have attempted to relate it to those classics such as Dejerine, von Monakow, Van Gehuchten, Cajal and Mingazzini and held it a peer if not a superior.

The present volume finishes the discussion of the trigeminus which was begun in the first volume; it also gives a complete resumé of the eighth nerve which is most stimulating.

The gasserian ganglion is here considered as an agglomeration of spinal ganglia belonging to all of the spinal segments from CI to the most proximal of those which intervene for the innervation of the skin. In the first volume the full significance and importance of the trigeminus was not exhausted. Winkler has therefore devoted his first chapter in this volume to those problems relating to a study of these systems. The peripheral distribution follows the older accepted triple division from which the nerve has derived its name; the ophthalmic, the superior, and inferior maxillary.

The ophthalmic branch is rich in autonomic and centrifugal secretory, vasomotor and pupillary fibers. Those least known are connected with lachrymal function. The glands receive stimuli not only by way of the lachrymal but also by way of the zygomatic through the ansa anastomotica. Their secretory pathway is sketched as follows: Through the glossopalatine they continue without interruption their preganglionic course by way of the major superficial petrosal in the sympathetic network, to arrive in the ciliary ganglion by the sympathetic roots of this ganglion. There they are interrupted as in an autonomic prevertebral ganglion and pass by the long sensitive roots of this ganglion in the trunk of the V to reach the lachrymal gland. The ciliary ganglion is a prevertebral ganglion not only for the fibers of the lachrymal gland but also for the secretory fibers which regulate the internal liquids of the eye of the ciliary region. These very probably have their origin in the most proximal portions of the medulla. They accomplish their pre-

ganglionic course in the sympathetic plexuses of the carotids and cavernous sinus. They attain the ciliary ganglion by the sympathetic roots and after their interruption in the ganglion their postganglionic pathway corresponds to the short ciliary nerves, maybe also by the long roots of the long ciliary nerves.

Notwithstanding the extreme complexities of the condensed, distorted and displaced metameres of the head region, Winkler gives us a singularly clear portrayal of one of the most difficult and important nerve regions of the body. The first hundred pages of the book are devoted to the trigeminus.

The rest, 250 pages, takes up the eighth nerve. In the beginning of this chapter (VIII) on the system of the eighth nerve Winkler develops a slightly different concept of the anatomical situation. Whereas a tendency of late years has been to reason that the auditory and the vestibular apparatuses are two separate and distinct nerve systems, Winkler holds that there is a much closer relationship between them than that which appears on the surface. Heretofore the sacculus, utriculus and semicircular canals have constituted a static organ in which are originated the reflex activities necessary to the maintenance of our position in space, and the cochlea serves as an organ of hearing with no precise analogies to be found in lower animals. This general view Winkler maintains is a little too rigid and is only partially justified by the anatomical facts.

The *statocyst* of lower animals, he shows, even in its simplest forms, performs more than one function. It gathers the local effects of exterior excitation, rhythmic or non-rhythmic; it registers the movements of the surrounding liquid whether due to liquid or air shock, provided such stimuli determine a displacement of the body, and in its latest developed and most specialized form, the organ is sensitive to other stimuli. Thus in Pterotrachea, a simple mollusc, the otoliths respond to air vibrations which have been transmitted to water. In a much simpler animal, Eucharis, Verworn has shown analogous mechanisms.

In the mammalia there are to be distinguished at least four neuro-epithelial structures: [a] the striae nervosae in the semicircular canals; [b] the maculae, or taches sensorielles of the utricle and saccule; [b] the cristae, or cretes sensorielles, of the ampoules; [d] organ of Corti, in the cochlea. The most recent of these is the organ of Corti, which reaches its complete development only in the mammalia. The cretes sensorielles of the ampoules are older; the oldest of all the structures are those of the maculae.

Winkler compares the maculae to the primitive statocyst of invertebrates. These organs primarily function for the maintenance of general muscular tonus. They collaborate with the proprioceptive stimuli from the body. The function of the cretes sensorielles of the ampoules is of later evolution, and is more specialized. They have appeared for the registration of the movements of the head and for the head organs, chiefly the eye

movements. They remain in close liaison with the general tonus functions of the maculae. These regulatory functions are strictly condensations of geotropic reflex activities and are purely unconscious. Rhythmic activities have not yet taken on their social role. These are still to develop as various forms of more conscious bodily displacement, marching, dancing, unison actions, etc., chiefly initiated through sound waves, and closely related with the development of laryngeal and buccal proprioceptive stimuli associated with the developing speech function. Thus the organ of Corti has come to be developed in response to a wider conscious acquisition of control of bodily movement, including tongue movements, i. e., speech, in its social orientation function. These reflexes for bodily orientation are no longer geotropic and entirely unconscious, they are taking on sociotropic activities, partly conscious and in the highest cultural types becoming consciously socially valuable. The organ of Corti then is functioning in response to rhythmic or interrupted stimuli from the bodily organs and from the tongue through its symbol formations. How Winkler further develops his argument must be left to the reader, who will be well repaid, we believe, to go carefully over the details [p. 127 et seq.].

Nowhere has the reviewer found so sound or penetrating a view of the development of the affective response to sound stimuli through muscular displacement and imitation. What the newer psycho-pathology is finding out with reference to unconscious social reactions to tone, to voice, etc., is well worked out by Winkler in his analysis of the unconscious reflex awakening of sonorous response to motor stimulus. Thus is laid down a true physiology of affective effector release from the sound — and vision — of muscular stimuli in the environment. We thus see how extremely valuable language has become as a type of release mechanism through gradual condensation of language symbols. Thereby the body and its organs are not required to go through severe and dangerous displacements if through language the necessary socially valuable protective reflex can be found. The reviewer has developed elsewhere a definite corollary of this in speaking of the affective discharge value of the symbol, particularly in its relation to a dynamic pathology in chronic disease of various types, and this complete analysis of the pathways through which and by means of which this is made possible is of much interest. The whole psychopathological argument relative to human response to emotional stimuli is brought nearer to structural facts in this masterly chapter on the eighth nerve.

We would like to extend this review and take up a number of far-reaching suggestions developed by the author, but we can not.

Here is a book to be read and digested. The Dutch school may be proud of its Dean, in that he has given a work of lasting benefit to his colleagues and to humanity. May he be spared many years to complete this ambitious task. JELLIFFE.

Bloomingdale Hospital. A Psychiatric Milestone. 1821-1921. [Privately Printed by the Society of the New York Hospital, 1921.]

This delightful memorial volume commemorates the 100th anniversary of the opening of Bloomingdale Hospital as a special department for the treatment of mental disorders in the New York Hospital. It gives a recital of the exercises held in June of 1921 as commemoration of this event. Dr. W. G. Russell, Superintendent, tells us of the occasion and its mission. E. W. Sheldon, President of the New York Hospital, gives an Historical Review of the Institution, illustrated by old and new photographs. Dr. Adolf Meyer writes on the Contributions of Psychiatry to the Understanding of Live Problems; Dr. L. F. Barker on The Importance of Psychiatry in General Medicine; Dr. Geo. D. Stewart presents the Greetings of the New York Academy of Medicine, Dr. R. G. Rowe, of London, speaks of the Biological Significance of Mental Illness, Dr. Pierre Janet, of Paris, writes on the Relation of the Neuroses to the Psychoses and Dr. W. G. Russell on the Medical Development of Bloomingdale Hospital. Various appendices and letters are added.

The volume is an attractive one, giving concrete evidence of the advanced position taken by the Governors of Bloomingdale, and showing in a pleasing and practical manner what the present management is doing to further an advanced psychiatry, scientifically and humanely.

Freud, S. Drei Abhandlungen zur Sexual theorie. Fünfte unveränderte Auflage. [Franz Deuticke, Leipzig v. Wien, wks. 20.]

These well known "three contributions," which have been translated in English, Russian and Hungarian, appear in a fifth unchanged edition. As in his introduction to the third edition, Freud specifically states that the present contribution is solely one which sets forth the possibilities of a psycho-analytic technic in throwing light upon the psycho-sexual development of human beings. That the objection of Pansexualism should be raised against the general principles, causes him some amusement at man's stupidity and encourages him. should he have ever claimed such a doctrine, to quote from masters of philosophy immemorial how important a part the god Eros of the Greeks has always played in human affairs.

Bleuler, E. Lehrbuch der Psychiatrie, 3d Auflage. [Julius Springer, Berlin.]

Two editions of Bleuler's Text-book of Psychiatry appeared during the period of the World War. The first in 1916, a second in 1918, and now a third, and we learn that an English translation is in progress.

There are many reasons for the success of this book. In the

first place it is a convenient size, approximately 500 large octavo pages, it is exceedingly well written, and above it it is written from a dynamic viewpoint. Descriptive psychiatry is not neglected, but Bleuler has avoided the manufacture of artificial monstrosities which, while excellent abstractions, have no real counterparts in nature. Furthermore, he has not lacked the courage to say how far present knowledge goes in its attempt to understand certain psychotic manifestations, preferring to state at times what we do not know rather than what we think we do. He has accented the value of psychological concepts for the understanding of mental problems, maintaining, and we believe correctly, that a psychiatry without psychology is as futile as the omission of physiology in the understanding of internal medicine. In large part he has used psychological concepts which have been developed by him during the past 35 years. Bleuler has been one of the open-minded psychiaters who was able to affiliate much of the Freudian psychology into his own thinking — here are no simple Freudian repetitions, however, but a thorough reworking of many points of view in the light of his own experience. By reason of the compact setting necessary for a text-book his ideas of psychogenesis often suffer much abbreviation. They are always illuminating.

So far as classification is concerned, Bleuler follows the general Kraepelian schedule. He does this since he believes it the most widely accepted and hence more readily followed, but also because the general fundamental ideas upon which Kraepelin has founded his system offer the best practical grounds for a classification. Certain points of variation he emphasizes in many of his chapters.

While we would like to go into an extensive review of this interesting book, we must content ourselves with the general statement that we consider it the best single volume psychiatry with which we are acquainted.

Pollak-Rudin, Robert. GRUNDLAGEN DER EXPERIMENTELLEN MAGIE: MAGIE ALS NATURWISSENSCHAFT. [Franz Deuticke, Leipzig and Wien.

Two little pamphlets of telepathy and magic, etc., which get about as far as the general logical argument that because a photographic plate must be developed in the dark, therefore the bag of tricks of the spiritualistic performer should not be questioned because they demand the dark.

Semon, Richard. BEWUSSTSEINVORGANG UND GEHIRNPROZESS. [J. F. Bergmann, Wiesbaden.]

Semon's biological work was of the highest order. As a pupil of Haeckel he followed the naturalist's career according to the established customs of travel, collection, and study of his material. He accomplished much, and of this and other details of his rich life Otto Lubarsch gives an excellent resumé in the

forepart of this volume. The same well-known pathologist has edited this work posthumously. To the neuropsychiater Semon's works are valuable, since he tried to establish a working concept of what is meant by phyletic memory as laid down in instincts, habits, patterns, modes, etc. From the first etchings on protoplasm by external stimuli, so ably sketched by Hering, what reactive capacities were left behind as "*engrammes,*" as evidences of this writing into life, of experience. How were these built up by repetition of stimuli, and then how passed on in evolution. How discharged — ecphoriert — or thrown out as he expressed it. What, then, were the laws that not only governed the orderly collection of engrammes, but what were those laws that determined their discharge. The *Mneme,* or *Memory,* what was it as a complex synthesis of the engramm treasure? These and similar problems occupied the author for many years as he studied the fall of leaves in autumn, the budding of flowers in spring. What time stimuli, temperature stimuli, physical stimuli, etc., etc., had become part of the habit working machine, be it the lilies of the field, or man. How is habit written into structure and finally as a last supreme synthesis of nature's laws, how are the phenomena of mental processes finally correllated and worked into nerve structure.

Semon's Mneme, his Mnemische Empfindung and this final work contain an orderly presentation of the best series of thoughts along lines so constantly rising into the arena of the neurophyschiater's observations as developing in social conduct — spinal pathway conduct — peripheral nerve conduct, etc., etc. We recommend it heartily. It may be noted in passing Semon was well acquainted with Samuel Butler's observations — a series of fundamental biological ideas fortunately coming to their own concerning unconscious memory, etc. JELLIFFE.

Kretschmer, Ernst. KÖRPERBAU UND CHARAKTER. [Julius Springer, Berlin, 56 mks.]

The new constitution teachings are here made to contribute to the study of temperament. Red heads and fiery tempers are bywords of such liaisons, but the Tübingen Clinic is made to yield some interesting material. As here portrayed, Kretschmer determines three types of body structure which he names the Asthenic, the Athletic and the Pyknik types. Bauer has already outlined the more or less bovine nature of the asthenic type. These are long, thin, weak-muscled, soft-skinned people, with long noses, aesthetic profiles, pale and anemic, with thick curly hair and thin terminal hairiness, especially in their beards and moustaches. The athletic type needs no further characterization. It is well known. The pyknik habitus is bull-necked, big-chested, fat-bellied, with more graceful extremities — particularly definable in midde age. The head is large, round and deep, but not so high.

These types, according to our author, have special predilections for certain psychotic trends. The asthenic and athletic types run to schizophrenic dissociations — the pyknik types to cyclothymic trends. Further details of this generalization must be read in the original, which is filled with many suggestive analogies, out of which in time will emerge some relationships of interest if not of value. As the reviewer views himself in the glass he is convicted of the pyknik habitus. Lest his manic proclivities should betray themselves, he brings this review to a close with the reflection that it is an interesting, one-sided way of getting at things. The observations are worth checking up with other material.

Erben, Siegmund. Diagnose der Simulation nervöser Symptome. Zweite Auflage. [Urban u. Schwarzenberg, Berlin-Wien.]

We have called attention to the first edition of this valuable work. The second completely rewritten and enlarged edition is even more satisfactory, especially made so by the inclusion of the almost numberless opportunities of studying war situations, where simulation of all grades and varieties offered unparalleled facilities for observation, and differentiation of the material and judicial methods of handling the many situations developed.

Fankhauser, E. Ueber Wesen und Bedeutung der Affektivität. [Julius Springer, Berlin.]

Vol. 19 of the Foerster-Wilmanns Monographs maintains the high grade of this most valuable series. Here the author presents us with an extremely suggestive study in which he attempts an analysis of affectivity founded upon the reactions of the organism to light and to color. He, therefore, follows the general trend of recent workers who conceive of the activities of the human organism as a whole, in its response to physical and chemical environmental factors as playing upon the vegetative nervous system — including the endocrine organs. This analysis proceeds along the light and color range. Psychical processes are conceived of as physiological, with which no one will quarrel, and for him may be partly resolved into tropistic components, as Loeb and others have well shown, and as much recent American psychopathology concedes, notably Meyer, White, Kempf, Jelliffe and Timme, each in their minor-variant modes of approach.

The chapter headings afford a slight insight into this stimulating research. They are: I. Affect Brain, Vegetative Nervous System and Internal Secretions; Chemical Foundations of Affective Processes, their rôle in Manic-Depressive Psychoses and Paranoia. II. Parallelisms between Affect and Light and Color Stimuli. III. Conclusions on the Significance and Extension of the Affectivity. IV. Affectivity and Association Formation. V. Affectivity and the Psychoses.

We cannot go further into the author's argument, which we consider a legitimate and fruitful hypothetical approach. By such methods we conceive it possible to understand the nature of human behavior more fully and welcome this effort with hearty approval.

Schmidt, Albert K. E. Die paroxysmale Lähmung. [Julius Springer, Berlin.]

Periodic paralysis, familial or sporadic, is a rare syndrome, especially as manifested in its graver forms. In minor grades it is probably not as infrequent as has been supposed since Westphal and Oppenheim first gave it a fairly definite place in neurological nosology.

The present small monograph of approximately sixty pages — vol. 18 of the Foerster-Willmans Monographs — presents an excellent review of the disorder which by reason of its thoroughness, orderly, and logical arrangements will be welcomed by all neurologists. The excellent work by American neurologists, Burr, Taylor, Mitchell, Putnam and others, is given due credit and attention as well as the work of others. This is attested by the excellent bibliography of 64 studies on the subject.

The author deals with the initial stages, the well-developed attack, the recovery, complications, and interval periods. He discusses the hereditary features as essential, 81% of the cases showing marked familial traits, and in the pathogenesis accent seems to fall upon muscle ischaemia, through disturbance of the vegetative nerve control of the vascular supply of the affected muscles. The causes of the vascular constriction are not pursued further than the formulation of a specific disposition of these vegetative control mechanisms, in which suprarenal functioning seems to be involved. This is run as far back as being related to an interrelation between gastrointestinal function and sympathicotonia releasing increased adrenal material.

Emotional factors, as related to adrenal functioning, are strangely neglected — otherwise the analysis of the syndrome is very painstaking and illuminating. Jelliffe.

Entres, Josef Lothar. Studien ueber Vererbung und Entstehung geistiger Erkrankungen. Herausgegeben von Ernest Rudin. Munchen III. Zur Klinik und Vererbung der Huntingtonischie Chorea. [Julius Springer, Berlin, Mk. 88.]

Vol. 27 of the Foerster-Wilmanns Monograph Series contains another detailed research study from the hereditary section of the Kraepelin Research Institute. This deals with a problem which has received special attention from American students, Huntington's Chorea.

Entres does not get as far with the problem, it seems to the reviewer, as our American investigators have done. In fact, the Davenport and Muncie Studies, which grew out of Jelliffe's original material, are not mentioned. This is to be regretted.

Rudin himself has acknowledged this — since these most detailed analyses seemed to show the presence of a complex hereditary combination which, falling together, produce the disorder in Mendalian dominant fashion. Notwithstanding this lack, and also the overlooking of Roussy and Lhermitte's careful pathologic analysis, the monograph is well worth while and deserves widespread reading.

Fröschels, Emil. KINDERSPRACHE UND APHASIE. [S. Karger, Berlin.]

Here we have an entirely new type of study of the aphasia problem. This is a series of formulations on the aphasia problem from the standpoint of the development of speech in children and of their anomalies. In many relationships it may be studied with Pick's excellent monograph. As we purpose to present the entire aphasia problem in its more recent setting in the Journal, we shall not go further than say that Fröschel's most excellent monograph cannot be neglected by neuropsychiaters.

Vorkastner, W. EPILEPSIE UND DEMENTIA PRAECOX. [S. Karger, Berlin.]

Convulsive seizures, epileptiform in character, have been described as an essential part of the dementia praecox picture for many years. Kahlbaum, in his Catatonia describes them. A small number of monographs have been written upon them — this one of the author's, the latest. In 162 pages he discusses this relationship, which, while it happens he does not consider essential, and furthermore he describes the combination of epilepsy and dementia praecox. It is an interesting and valuable small volume.

Pötzl, Otto. ZUR KLINIK UND ANATOMIE DER REINEN WORTTAUBHEIT. [S. Karger, Berlin.]

Pötzl here discusses the relations between pure word deafness, conduction aphasia and tone deafness in a small but very well written monograph of some 80 pages. It makes up vol. 7 of Bonhoeffers series of Abhandlungen.

Pure word deafness, subcortical sensory aphasia of Wernicke, or perception word deafness of Henschen, is a comparatively rare happening and Pötzl's new case with anatomical findings pushes forward our understanding of this little observed aphasic syndrome. His patient showed a softening in the right T_1 of considerable extent, occupying the middle and posterior thirds of this convolution; also a second softening of the same side at the juxtaposition of the parietal and occipital lobes; on the left side there was a very small softening in the T_1 symmetrical with that of the right side. Further details must be consulted in the original. Pötzl comments on Liepmann's pronouncement against a psychological appraisal of aphasia. He holds that whereas this may be true for so-called

conscious psychology, the concepts of the newer psychology of Freud, make it possible to gain a deeper insight into the functions of speech and his conceptions with those of Semon, as particularly may be seen in V. Monakow's recent biological discussions, will be of much value in grasping the aphasia problem.

Schroeder, P. Die Spielbreite der Symptome beim manisch-depressive Irresein und bei den Degenerations psychosen. [S. Karger.]

In an excellent and clear manner Schroeder in 60 pages, attempts to show the present day criteria in clinical psychiatry by which the manic depressive group may be marked off from the degeneration psychoses. That both formulations are far from being very definite, he admits, but notwithstanding this, he has given an excellent small monograph.

Schmidt, Wilhelm. Forensch - Psychiatrische Erfahrungen im Kriege. [S. Karger, Berlin.]

The author is Privat Dozent in the Neuropsychiatric Clinic in Göttingen and served throughout the war. The present work is founded upon the study of 107 cases which came to observation at the Freiburg clinic from Jan., 1915, to the middle of 1917.

Full case histories are given of a vast variety of psychiatric cases — Deserters, quarrelsome soldiers, alcoholic soldiers, various psychopaths, hoboes, pathological liars, careless and unstable soldiers, Hysterias, Epilepsies with and without fugues, neurasthenics, defectives, schizophrenic and manic-depressives — these are all well described from the Hoche, Kraepelian and conservative school standpoints. This is about as far as war times permit. Deep psychological studies in wartime are useless so far as practical issues are concerned. Even that such a view point obtains in the psychiatric world is passed up.

Dollinger, A. Beitraege zur Aetiologie und Klinik der schweren Formen angeborener und früh erworbener Schwachsinnszustande. [Julius Springer, Berlin.]

The feeble-minded — these we always have with us. Also a plethora of books about them. In order to justify a new one, the author maintains he has not made a recompilation of old opinions, but has introduced new principles of study which he endeavors to show are of practical importance in a reallignment of old principles.

The most significant features of this practical scheme are found in his third chapter, where the individual types are considered. Here the author outlines: I. Those due to intra uterine developmental defects. II. Infectious, toxic, thrombotic or sclerotic processes affecting the brain and, III. Traumatic injuries of the brain, prenatal, at the normal end of parturition and in the early days of the new born.

We find much to commend in the author's very systematic presentation of the gross injuries which bring about severe forms of feeble-mindedness.

Hoffmann, Hermann. STUDIEN UEBER VERERBUNG UND ENTSTEHUNG GEISTIGER STÖRUNGEN. HERAUSGEGEBEN VON ERNEST RUDIN. MUNCHEN II. DIE NACHKOMMENSCHAFT BEI ENDOGENER PSYCHOSEN. [Julius Springer, Berlin. Mks. 136.]

The new Forschungs Institut of Mental Diseases in Munich, under Kraepelin's stimulus, has developed a number of research scholars. Of these Rudin stands as conspicuous as a specially qualified worker in problems of heredity, as did the late lamented Nissl and Brodmann in their respective spheres. This study constitutes a second contribution from the hereditary section of the Foschungs Institute under Rudin's leadership — the author being an assistant in the Tübingen Clinic, who, as other assistants in the German psychiatric clinics can spend part of a year or more on research problems at the Institute, a scheme of cooperation that might be followed more widely in our organized state services here.

In Rüdin's first contribution the ascendants in dementia praecox cases were studied. This monographic presentation of this research has already been reviewed in these columns. Hoffmann has devoted this monograph, 235 pages (No. 26 of the Foerster-Willmans Series), to a study of the descendents in the Dementia Praecox. Manic Depressive, and Epilepsy material of the Institut. He believes that distinct differences may be found in the descendant material in dementia praecox and manic depressive groups. Just what these are cannot be summarized here. They lead to too detailed a consideration for a review, but we consider that those interested in psychiatric problems will be amply repaid by a study of this extremely valuable and careful piece of research work.

Rixen, Peter. DIE GEMEINGEFÄHRLICHEN GEISTESKRANKEN IM STRAFRECHT, IM STRAFVOLLZUGE UND IN DER IRRENPLEGE. [Julius Springer, Berlin. Mrk. 48.]

Medico-legal students will greatly enjoy this volume, although it deals with the procedures of an entirely different nature from those that are prevalent in Anglo-Saxon jurisprudence. This jurisprudence, so far as the psychotic individual is concerned is most medieval and backward, but here and there as in Boston, under Healy's influence, and in Chicago, as guided by Adler and in other courts, a much more humane and progressive type of jurisprudence is making itself felt.

Dana, Charles L. TEXT BOOK OF NERVOUS DISEASES. [Ninth Edition. William Wood and Company. New York.]

The reviewer approaches a ninth edition with mingled feelings of admiration and proliferous discontent. Admiration that the background of authority should have been so compelling as to have per-

mitted — yea, encouraged — so many re-editions of an author's opinions. Discontent that this most excellent manual should not have been more consistently pruned and developed along the lines of more recent findings and hard won newer viewpoints.

Even the most presumptuous of reviewers should admit that among American neurologists Dana has made most valiant efforts to keep in touch with the advance of neurological science. He undoubtededly, in his general attitude, has shown — even though with certain reluctances — the wish to keep up with the march of progress, and even if wonderingly inadequate at times, has sacrificed old and cherished beliefs for the inexorable logic of neurological evolution.

Not that a text-book is by any means an adequate vehicle for the presentation of such gradual variations. It rarely is, and under the usual American book-printing limitations, an author is too infrequently admitted the free hand he often might wish, to make radical rearrangements of his subject matter. But when with an accredited prestige of nearly thirty years behind it, even such limitations should be ruthlessly overcome.

In general the work remains much the same as the last edition. Some newer material brought by the war's lessons has been incorporated. This has been too slight, we feel. A new chapter on Dynamic Psychology has been added. Here Dana is more sympathetic to recent psychoanalytic work than in his previous edition. Psychoanalysis is even recommended, very sparingly, it is true. Psychogenic factors and their symbolic camouflages are freely recognized much to the value of the work and as evidence of the author's still plastic grasp upon the ever widening horizons of medical thought.

In his preface the author would defend himself against being accused of nonprogressive trends, holding that the many of the newer acquisitions are as yet too illy organized to present to students of neurology. We feel that the students are being somewhat misjudged. A text-book can never present a solid phalanx of truth. It is only a fragmentary gesture after all, and as such should perhaps contain for the student not dogmatic categorical "established progress" only — but the many points of stimulus for further research that lie all along the pathway — still so woefully unillumined — as well. Concerning this, debatable questions arise, but at least a student is entitled to know some of the things as yet unknown, instead of what too often is presented — a solid block of things which being established already have been left behind in the march of progress. In this stimulating quality we find the book lacking. It is something the student can grind on and learn by heart for examination purposes. If this is the object of a text-book, well and good. It is an excellent one, even if the examiners are the sick patients needing relief,— but as a work that would lead the student to look up the problems to further research upon every question raised, here we think it lacking. If the beginning and end of all wisdom is here contained, so be it, but if not wherein does the author suggest to the student where he can find further information? If, for example,

he is not entirely content with being told that in paralysis agitans there are changes in the anterior horn cells, which of course is only a partial truth, or that the rubro-pallidal system is involved — how can he get more information on the subject? Certainly not here.

Dana speaks too much of diseases as entities. Epilepsy is a "disease;" paralysis agitans is a "disease." We hold that the day has gone by for this type of concept. Even the medical student talks of different types of pneumonic infiltration is due to differing causes and hence to be handled differently. Certainly a postencephalitic paralysis agitans is a different type of affair from the usual chronic Parkinsonian syndromy. The only common points are topographical. Similar structures are hit by different agents. These kinds of problems are all ruled out by a rigid doctrinal attitude, which no doubt is conceived of a being "good for the student." The reviewer differs radically from the author on this point, and finds the too rigid formalism of direct positive statements about this and that, not only misleading, but even often untrue. Such kind of teaching, if pushed too far, leads to the manufacture of parrots and not to real investigators. American medical students suffer too much from this type of teaching, an issue which is not the special attitude of the reviewer but a universally recognized defect in educational methods throughout, and one which the author himself deplores.

Müller, L. R. Das vegetative Nervensystem. [Julius Springer, Berlin.]

A monographic treatise on the vegetative or visceral nervous system has long been a desideratum. Higier's excellent short work has heretofore occupied the field. Müller, with Dahl, Glaser, Greving, Renner and Zierling, has written an anatomy, physiology and psychology of the vegetative nervous system in 229 pages with 168 illustrations. It is by far the best available anatomy on the subject — a less satisfactory physiology and a disappointing psychology.

He has intentionally delayed attempting a pathology of the vegetative nervous system, notwithstanding its major importance, since he holds the material has not yet been sufficiently worked over to justify such a volume.

In a sense the work must be called a general orientation in the field. The difficulties are great, since the vegetative nervous system is phyletically so old and so overladen with the myelinated somatic sensori-motor system, but neurological science is slowly having offered to it data upon which a real dynamic physiology and pathology can be reared. We welcome this more than valuable contribution to that end and hope the day will soon arrive when Müller will give us a more functional view of this whole field. No one is more competent to do it and as soon as all of the war vivisections have been completely collected and analyzed, marked progress is to be expected. Spiegel's excellent and recent Referat is an indication of the richness of this material which we hope soon to see codified and systematized for practical neuropsychiatric work.

VOL. 55. MARCH, 1922. No. 3.

The Journal

OF

Nervous and Mental Disease

An American Journal of Neurology and Psychiatry, Founded in 1874

ORIGINAL ARTICLES

CLINICO-PATHOLOGIC NOTES ON SOLITARY TUBERCLE OF THE SPINAL CORD*

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It is generally admitted that so-called solitary tubercles of the brain or spinal cord are usually, if not always, associated with a tuberculous meningitis. On the other hand, it has been noted that a tuberculous meningitis, as a rule, spares the substance of the brain or spinal cord,[1] which, if involved, become so, as generally believed, either through the direct spreading of the morbid condition from the diseased meninges to the adjacent parenchyma or through the simultaneous involvement of the latter by the tuberculous process.

This question of mutual relationship between tuberculosis of the parenchyma and that of the meninges is of great interest, for it has some bearing on the important problem of the mode of spread of an infection from the spinal cord to the meninges and vice versa. Soli-

* From the pathology laboratories of Illinois State Psychopathic Institute and Cook County Hospital, Chicago, Illinois, and laboratories of Columbia Hospital, Milwaukee.

[1] See for instance Sittig, O., Ueber einen eigenartigen Destruktionsprozess der Hirnrinde bei einem Falle von Hirntuberkel, Zeit. f. d. ges. Neurol. u. Psych., XXXIII, 1916, p. 301.

tary tubercles of the spinal cord as well as of the brain are especially suitable for such studies since they represent circumscribed, well defined formations, divided from the pia-arachnoid membranes by more or less preserved tissues. They represent, as it were, isolated foreign bodies against which the nervous system reacts in various ways and of which it tries to rid itself. On the other hand, such tuberculous formations are by no means a very common occurrence and are therefore also of sufficient clinical interest. Of the three cases that formed the basis for the present pathologic study one was a case of a tubercle of the optic thalamus, one of the spinal cord reported by Bassoe (1) and the third was also a case of solitary tubercle of the cord that came under the observation of one of us (Thalhimer) and will be recorded in full, together with a brief report at the end of this contribution of similar cases gathered from the literature. The case of the optic thalamus tubercle could not be studied in detail as only fragments of this tumor were available, the brain having been destroyed soon after the autopsy made six years ago.

REPORT OF CASE AND DISCUSSION OF THE CLINICAL FEATURES OF SOLITARY TUBERCLE OF THE CORD (DOCTOR THALHIMER)

Patient S. V., 28 years old, admitted 2/6/20 to Columbia Hospital, Milwaukee, complaining of backache and stiff back.

Family History: Unimportant; no history of tuberculosis.

Past History: Unimportant.

Present History: For about a year before admission backache and stiff back had prevented the patient from bending his back as he had formerly done.

Physical examination: No abnormality found; all reflexes normal. Examination of chest revealed few rales at right apex, no signs of consolidation. Temperature occasionally rose to 101° F.

X ray examination: Showed marked evidence of beginning osteophytes at practically all of the corners of the lumbar vertebrae. Transverse processes of the fifth lumbar vertebra are large and shadows overlap the ileum. The condition was considered one of osteo-arthritis of the spine and a plaster jacket was applied before patient left the hospital.

5/13/20: Readmitted to the hospital. The condition has gradually grown worse, there being more pain and more limitation of motion of spine. Plaster cast reapplied.

10/12/20: Patient again returned to the hospital, with the original symptoms increased and with a new group of symptoms; loss of

power in both legs with spasticity; numbness of both legs; urinary difficulty and constipation. When he left the last time he had practically only backache. He left hospital in a body cast which was applied for about three and one half months. When removed, the pain in lower part of spine had disappeared, but instead there was a pain in upper part of spine between the shoulder blades, the lower part of spine being immobile. Pain in spine is intermittent, sometimes sharp, sometimes dull. Patient frequently awakes with a feeling that someone has hit him on the back; a sort of stinging sensation. About three weeks ago he felt extreme weakness in both legs and went to bed. Since then he has lost entire use of both legs. At frequent short intervals either leg goes into a spastic condition lasting for just a moment. Patient has no pain in legs, only feeling of numbness. Ever since he left the hospital previously he has had a gradually increasing constipation. He has had no bowel movements at all lately without use of cathartics. Patient states that there is a sense of numbness in the rectum and bowels. Patient has had no involuntaries but for the last three weeks he cannot tell whether he has urinated or not. He is able to control the passage of urine but does not know when the flow starts or ceases.

Physical examination: While lying quietly in bed has a clonic spasm of either leg every few moments.

Head: Scalp: Eyes: Negative.

Lungs: There are a few scattered, fine, sub-crepitant râles near hilus of left lung. There is no bronchial breathing. No percussion dulless.

Heart: Negative.

Abdomen: On right side of abdomen there is impaired sensation to pain and touch, below seventh rib, and this extends down to toes, with anesthesia just below the right costal margin. On left side there is a band of hyperesthesia at the level of the umbilicus. There is slightly impaired sensation to touch and pain on left side of abdomen and down left extremity. Posteriorly the areas of impaired sensations correspond roughly to the anterior findings. The same holds true of legs. The spine is negative to palpation.

Reflexes 10/23/20	Right	Left
Knee jerks	++	+++
Babinski	++	+++
Ankle clonus	++	+++
Oppenheim	+	+
Chaddock	+	+
Gordon	○	+
Cremasteric	○	○
Abdominal	○	+

X ray examination: Osteophytes of the entire lumbar and eleventh and twelfth dorsal vertebrae.

10/15/20: Patinet was unable to void urine and from this time on had to be catheterized.

Lumbar puncture: Only about 3 cc. of bright yellow, clear fluid could be obtained. Six cells per c. mm.—all small mononuclears.

Wassermann (spinal fluid): Negative.

Blood Wassermann: Negative.

The diagnosis arrived at was that there was a pressure lesion of the spinal cord at about the fifth–sixth dorsal vertebrae. Because of the osteoarthritic condition of the spine it was thought that possibly in some very peculiar way, which however could not be demonstrated with the X ray, some ossifying process was causing this pressure. The diagnosis of spinal cord tumor was, of course, seriously considered, but this diagnosis was put in a secondary position because of the long history of the ossifying spondylitis.

10/26/20: Laminectomy by Doctors Gaenslen and Le Cron: exposure of the cord at the level of the fourth, fifth and sixth dorsal vertebrae, no evidence of pressure. Pulsation normal. Dura opened and probe was passed upwards and downwards for a distance of at least three vertebrae in each direction without detecting any abnormality. The exposed cord was elevated laterally on each side and the spinal canal thoroughly explored; no abnormality was found. Wound was then closed.

12/6/20: The paralysis and sensory disturbances continued to progress.

Spinal puncture: As previously only 3-4 cc. of bright yellow, clear, spinal fluid could be obtained. This fluid soon clotted in the tube (typical Froin syndrome). A pressure on the jugular veins at the root of the neck normally causes an increased flow of spinal fluid (as demonstrated by Ayer) but caused no further flow of spinal fluid in this case. There was a 5 mm. ring of albumin; globulin positive, and with Fehling's solution, instead of reduction, a violet biuret reaction was obtained.

The diagnosis was now inevitable that there must be a spinal cord tumor above the level where the cord was previously exposed.

2/4/21: Second operation by Doctors Gaenslen and Le Cron: The spinal cord beneath the first, second, third and fourth dorsal vertebrae was exposed. Through the dura a palpating finger disclosed a hard mass, feeling like a bony prominence from the anterior wall of the spinal canal, rather diffuse, the size of an almond, and at

the level of the second dorsal vertebra. The dura was then opened and an intramedullary tumor was visible as an ivory white mass about .6 x 1 cm. in size extending slightly to the left of the median line and surrounded by a zone of dilated capillaries about 3 mm. wide. There was a very large, longitudinal vein in the pia, slightly to the right. The cord was incised longitudinally and a small portion of the tumor removed for examination. It was then found that the tumor began to separate from the structure of the cord, and with a small brain spatula the entire tumor was gradually enucleated. This left a marked defect in the cord, only about one-third of the original cord structure being left on the extreme right side of the defect. The incision was closed in the usual manner.

Specimen removed at operation—description gross: Specimen consists of a cylindrical piece of tissue 2 cm. long by 1.1 cm. in diameter. The surface is rough, as though it had been dissected out and the ends more or less flattened, but slightly rounded at the edge. It is very firm, about the consistency of a uterine fibroid. The surface is cream colored and the cut surface, from section which had already been made in the longitudinal direction of the cylinder, is creamy yellow in color. The tissue is fairly homogeneous, the cut surface being smooth and glistening and slightly translucent. On further sectioning there is found in the center portion an irregularly rounded area about 7 mm. in diameter, which is slightly more yellowish than elsewhere and slightly opaque, giving the appearance of an early stage of degeneration.

2/17/21: There was no improvement in the patient's condition, since the operation, he gradually lost ground, became more and more emaciated and ceased to breathe on this day.

Autopsy: Anatomical Diagnosis: Solitary tubercle (removed at operation) of spinal cord, osteoarthritis of spine[2] and bilateral, iliopsoas, tuberculous abscess. Scars (tuberculous) at the apices of both lungs.

Body of an extremely emaciated young man. There are large bed sores present over both hips and buttocks. From the upper dorsal region of the back there is a scar from an old healed surgical incision in about the midline, about 15 cm. in length, extending from about the seventh or eighth dorsal vertebrae to the fourth. Above this scar there is a more recent, healed surgical incision ex-

[2] This was probably tuberculous in origin, because the bilateral iliopsoas abscesses were tuberculous. No tuberculous focus, however, was found in the vertebrae, and the productive osteoarthritis of the spine (as shown by the x ray) is not commonly found in Potts' disease.

tending upwards from the older scar to the region of about the first dorsal vertebra. The tissues beneath the old scar are firm and well healed. Beneath the new scar the tissues are infiltrated with a thick, purulent exudate as far as the dura of the cord. The laminae beneath both of these scars are absent but beneath the older scar there has been considerable bone regeneration immediately next to the dura. The dura was exposed from the region of the seventh cervical vertebra to the eighth dorsal. The dura is found intact and two suture lines identified because of the black silk sutures. Each of these are about 8 cm. in length and separated from one another by about 3 cm. The segment of the cord thus exposed was removed with the dura intact. The dura was then opened on the dorsal side, and beneath partial defect in the cord. The upper and lower ends of this defect are rounded and reddened (the defect is not quite so large as it was at the time of operation). There are no gross indications of meningitis. The bodies of the vertebrae beneath the segment of the cord removed were opened (from the rear) with a chisel and no definite pathological condition found. The bodies of the vertebrae were exposed from the front by removing all of the thoracic and abdominal viscera. Alongside the vertebral column, extending from the level of the tenth dorsal vertebra downward, including the sacrum, and situated beneath the iliopsoas muscle and in the retroperitoneal space on each side of the spine is a rounded bulging mass. When incised throughout its length this is found to consist of a diffuse, thick, purulent and caseous material. There is a slight amount of new bone present on many of the vertebrae at the margin of the intervertebral disks extending outwards for about one-half cm. No areas of bone destruction could be found on inspection. The anterior portions of the bodies of the vertebrae were then removed with a chisel, from the fourth lumbar to the second dorsal. No marked change was found in their structure, but the tenth and eleventh dorsal were somewhat pale in color and appeared somewhat denser than the cancellous bone in the other vertebrae.

Thoracic and abdominal viscera: The apex of the right lung was densely adherent to the pleura and showed beneath the pleura a firm, scar like area which on incision was found to contain calcium. This area is 1 x 2 cm. The left apex was also adherent and shows a smaller scar and smaller area of calcium.

The tracheobronchial lymph nodes are somewhat larger than normal but otherwise appear normal. The remainder of the viscera appeared normal.

Microscopical: Cancellous bone from the body of one of the tenth dorsal vertebrae—three sections, including a portion of the intervertebral cartilaginous disk: The bone structure is normal. the bone marrow throught practically all three sections shows no fat, but is made up of hemopoietic marrow. Near the edge of one section is a small area of coagulation necrosis, which may be caseation.

Iliopsoas Fascia: Shows many typical tubercles, with giant cells and caseous material.

Discussion

The case (S. V.) reported here showed several clinical features, which, together with some data from the literature, are worthy of a brief discussion.

The spinal cord symptoms and signs were those of tumor of the spinal cord. Had not an osteoarthritis of the spine preexisted, which suggested the possibility of pressure on the cord from this process, the preoperative diagnosis should have been "tumor of the spinal cord." Therefore, solitary tubercle of the cord must be considered in all cases with symptoms of primary tumor of the cord.

A complete Froin's syndrome was present in the spinal fluid, *i.e.*, clear, yellow fluid which clotted spontaneously. This is considered by some observers, in the absence of history of trauma, to be pathognomonic of a spinal cord tumor. Ayer (7) gives a broader significance to this phenomenon, and believes it to indicate spinal cord compression.

There was evidence to show that the spinal cord was not only compressed, but the spinal canal was completely blocked at the level of the tubercle. This was demonstrated by a procedure devised by Ayer. He has demonstrated in animals that with a needle in the cisterna magna and one in the spinal canal, pressure on the jugular veins at the root of the neck causes both the intracranial and intraspinal pressure to increase with a jump. When the spinal canal is blocked, the pressure increases above the level of compression, but not below it. Ayer (7) has therefore suggested that this phenomenon may be used in demonstrating a block in the spinal canal by simply noting, with the aid of a lumbar puncture performed below the spinal cord lesion, whether pressure on the jugular veins increases the intraspinal pressure or not. In cases with the spinal canal patent, the intraspinal pressure always becomes increased. We have confirmed this finding of Ayer in a large number of lumbar punctures. Pressure over the jugulars has always caused the

spinal fluid to run from the needle a great deal more rapidly. Sometimes it has even spurted out, whereas, before application of the jugular pressure, and after it, the fluid came out slowly, drop by drop.

Repeated lumbar punctures in the case reported yielded only from one to four cubic centimeters of fluid and pressure on the jugulars caused no further flow. We, therefore, felt certain that whatever the nature of the lesion it had caused a complete block of the spinal canal.

This conclusion calls attention to an observation made at the first operation. A probe was passed between the dura and cord beyond the region where the tubercle was found at the second operation. Nevertheless, in spite of the functional block in the spinal canal, the probe met no obstruction. Also, it was impossible to detect the presence of the enlargement caused by the tubercle. The inability to detect a spinal cord tumor by this method is well recognized and is again verified in this case. The lesson to be learned is always to be sure in operating cases with cord level lesions to perform the laminectomy high enough, and never to trust the evidence obtained by passing a probe in the spinal canal beyond the exposed area of cord.

The question of operability of tubercles of the spinal canal and their removal suggests itself. The tubercle in this case was easily enucleated, as was also possible in two reported cases; those of Veraguth and Brun, and of Elsberg. In the reported cases complete functional cures occurred. In our patient there was so much loss of spinal cord substance that there was no return of function, and the patient died from exhaustion and other causes secondary to his complete paraplegia.

It is believed that when the tubercle is solitary and not multiple, and if there is not an extensive generalized tuberculosis, operative removal is indicated in spite of the localized tuberculous meningitis situated about the tubercle. There are several reasons for this opinion. The tubercle is usually easily enucleated. The meningeal tubercles are thought to be secondary to the solitary tubercle, and the removal of the primary focus would get rid of this feeding focus. There seems to be a tendency for the secondary meningitis to regression and healing after the solitary tubercle is removed as is demonstrated by the recovery of the successfully operated cases of Veraguth and Brun, and Elsberg. This tendency to spontaneous cure of the localized tuberculous meningitis after operative removal of the nearby solitary tubercle of the cord can be considered as

analogous to good results in tuberculous peritonitis after abdominal exploration. It is well recognized that many cases of tuberculous peritonitis regress and even go on to apparent cure after simple laparotomy. The belief is that by this procedure reactive phenomena are stimulated which enable the body to overcome the tuberculous infection. It seems possible that the same process would occur with a localized spinal tuberculous meningitis and therefore this meningitis need not be considered as a contraindication to operation for removal of a solitary tubercle of the cord.

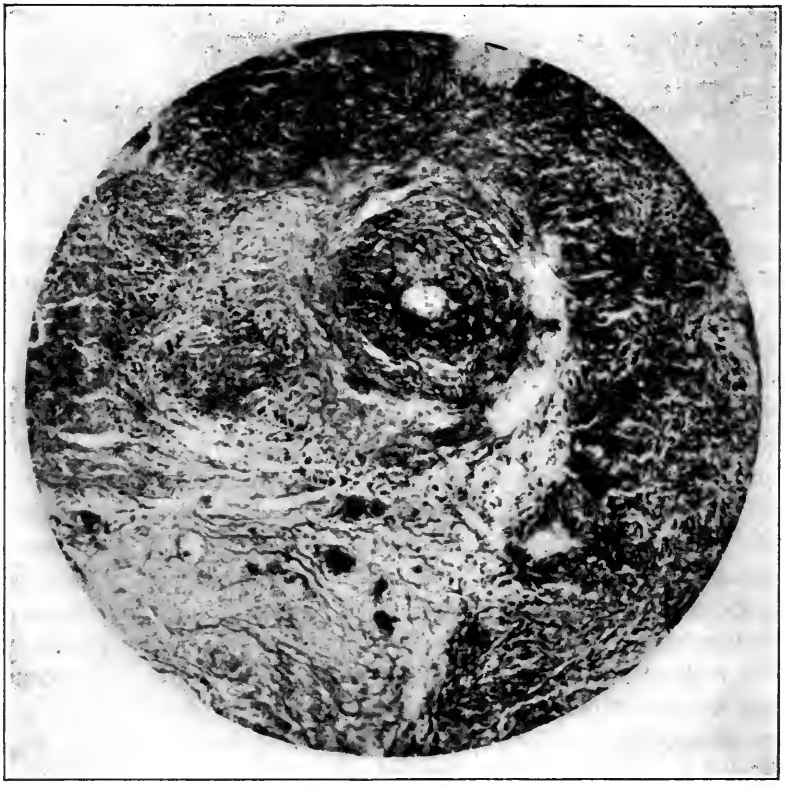
Microscopical Examination of Tubercle Removed at Operation and Spinal Cord Removed at Autopsy (Doctor Hassin)

This included the damaged portion of the spinal cord (containing the cavity), the tubercle itself (removed during the operation and thus leaving the cavity), the areas above and below the cavity, the meninges (including the dura) and the spinal roots. The tubercle and its remnants around the cavity exhibited a great mass of distinct foci, or miliary tubercules, which stained poorly. The majority were caseous, granular in appearance and without vessels, while some showed vessels with walls more or less thickened or were made up of concentric rings of connective tissue fibres. The latter frequently formed a distinct network whose meshes harbored ill defined cellular elements. Some resembled fibroblasts, but hematogenous elements, such as lymphocytes, polyblasts, plasma cells or leucocytes could not be discerned. Other tubercles showed no caseation, no vessels, but merely fragments of connective tissue fibres without any traces of cellular elements (Fig. 1). The same figure shows a tubercle containing a blood vessel surrounded by a homogeneous area. Some tubercles exhibited blood vessels with a well preserved elastica which was often doubled, split or broken up, the endothelial cells markedly swollen and protruding into the lumen usually detached from the adjacent subendothelial layer, the empty space packed with various mononuclear elements. The adventitia of such vessels was always thickened, hyperplastic and packed with an enormous amount of broken up, disintegrated, ill defined cell elements.

There were again tubercles, granular, badly stainable, containing some giant cells and enveloped by a capsule of fibrus tissue. They either showed no vessels at all, or vessels with an occluded lumen, thrombosed or filled with a mass of detached endothelial cells. In

short, the miliary tubercles which made up the mass of the solitary tubercle were either fibrous formations or in a state of cheesy degeneration (cheesy tubercles). The latter represented regressive, broken up tubercles, the former a stage of healing. Quite often the miliary tubercles were divided from each other by a dense network

FIG. 1



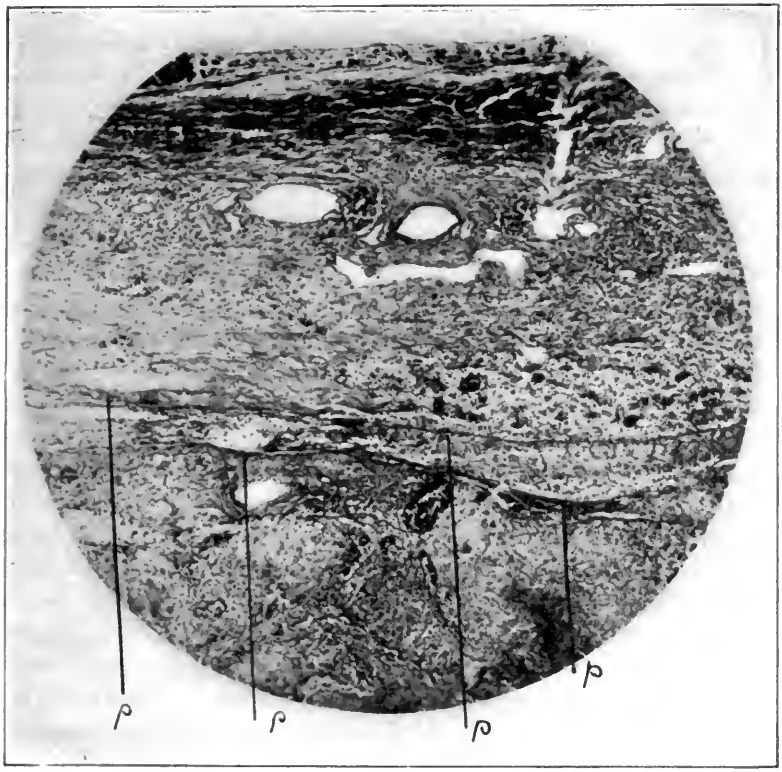
In the upper half of the photomicrograph two tubercles are distinctly seen. One—to the right, around a patent blood vessel containing some red cells—is in the process of formation, the one—to the left—is completely formed and partly broken up. Use hand lens. Alzheimer-Mann stain x 160.

of connective tissue. The latter sometimes was of unusual thickness, hyaline in appearance, enclosing within its meshes various undefinable, mononuclear elements as well as masses of detritus. Marchi stained specimens revealed in such areas minute dust-like particles of fat as well as occasional fragments of broken up nerve fibres, freely and irregularly scattered. As a rule, however, the

tubercles showed no traces of nerve tissue, glia cells or glia fibres, all these ectodermic elements having been replaced by connective tissue and masses of the cheesy islands—degenerated tubercles.

The foregoing tubercle masses that made up the solitary tubercle had been surrounded by and divided from the adjacent pia by a narrow zone rich in capillaries and small vessels which were intensely

FIG. 2



The lower half of the photomicrograph representing the spinal cord covered with tubercles is divided from the upper half—the infiltrated and thickened dura—by a split and infiltrated pia (p. p. p.) Bielschowsky stain x 60.

hyperemic and sometimes infiltrated. This area also showed an abundance of blood pigment granules, glia nuclei, scattered red cells, numerous rod cells (*Stäbchenzellen*) and white blood cells with a light biscuit-shaped nucleus much resembling Maximow's polyblasts. In general, this zone, so called zone of hyperemic vessels (hyperemic zone), showed no definite structure, the hemosiderin and red cells having been evidently the result of the operation on the cord.

This hyperemic zone was closely followed by the spinal meninges, pia arachnoid and dura, with which it was blended forming one mass (Fig. 2). In this, at first glance, it was rather difficult to discern the component structures. Only with special stains, such as Alzheimer-Mann, Jacoby-Mallory, van Gieson, was it possible, for instance, to single out the pia mater, to follow up the course or define the exact relationship of this membrane to the spinal cord. It appeared as a distinct strand of connective tissue, separated from the spinal cord, and not invaded or transgressed by the tuberculous masses (Fig. 2). This membrane was rather excessively vascularized and showed an abundance of reactive phenomena in the form of small scattered inflammatory foci. The blood vessels were not occluded, but were often infiltrated with plasma cells and lymphocytes. The cellular infiltration was in some instances quite marked appearing as dense, poorly stained rings or muffs around smaller blood vessels and much resembling a caseous tubercle.

The vascular infiltrative phenomena were associated with other reactive phenomena in the pia, principally in the form of abundant proliferation of fibroblasts, round or spindle-shaped cellular bodies containing large pale nuclei. Equally numerous were polyblasts, plasma cells, macrophages, gitter cells, and comparatively fewer, though quite numerous, polymorphonuclear cells and very scarce giant cells,—all these elements were mixed with a great number of newly formed pial capillaries especially at the level of the tubercle. The foregoing inflammatory phenomena were, however, also quite in evidence in the portions of the pia situated above and below the area occupied by the latter.

The dura (Fig. 2) was even more densely infiltrated than the pia arachnoid with which it was blended, the subdural space being totally obliterated. The cellular infiltration involved all the layers of the dura as well as the so called dural interspaces which were densely packed with lymphocytes, plasma cells and fibroblasts, the last being of especially large size and densely surrunding the thickened vessels. The epidural layer was very rich in giant cells and in large plasma cells containing as many as six nuclei, while the connective tissue as well as the elastic fibres appeared quite normal. The dural changes were, like those in the pia, widespread, that is to say they were present at every level of the spinal cord, but were especially marked around the tubercle. The same infiltrative and productive phenomena were present in the roots, especially the posterior ones, where, in addition, marked degenerative changes could be seen.

Thus, many fibres appeared degenerated or were totally lacking, while the endo-, peri- and epineurium were thickened and hyperplastic. Such root changes were most marked in the region of the spinal cord harboring the tubercle but were more or less present in other areas at a distance from the latter.

A few words might be said as to the condition of such other portions of the spinal cord. The lumbar or cervical regions, for instance, exhibited only signs of secondary degeneration, which involved both the gray and surrounding white substances, the marginal areas being comparatively but mildly affected. Stained with Marchi, the sections showed an enormous amount of black globules, while Alzheimer-Mann or Jacob-Mallory stains brought out the remarkable glia changes which are so typical for secondary nerve degeneration. Thus, the glia tissue almost entirely replaced the parenchyma —the gray as well as the white substance—showing either as large monster glia cells with abundant protoplasm containing an eccentric, chromatin rich nucleus and numerous ramifying processes, or they showed as myelophages, with abundant large vacuoles harboring remnants of myelin or as various form of gitter cells gathered around the smaller vessels and capillaries. In none of these areas were signs of tuberculous material or of inflammation present.

General Summary and Discussion of Pathology of Tubercle of the Cord

1. Transformation of a portion of the spinal cord into a mass of miliary tubercles, partly cheesy, partly fibrous.

2. Typical secondary degeneration of the spinal cord above and below the tuberculous mass.

3. Extensive lepto-, pachy- and peripachymeningitis with involvement of the spinal roots, especially marked at the level of the spinal cord harboring the tubercle.

4. Total absence of the inflammatory phenomena of myelitis in the areas not affected by the tuberculous process.

The outstanding feature was the loss of the usual array of ectodermic and mesodermic elements of the spinal cord and their replacement by a mass of tubercles. As a matter of fact, only the mesodermic portion of the spinal cord, the blood vessels and the septal connective tissue, were in evidence, while the ectodermic elements—the glia cells, glia fibres, ganglion cells and the majority of the nerve fibres—were entirely destroyed. The mesodermic elements, in contrast, showed remarkable phenomena, especially in the

vessels. The latter surrounding the tubercles were often hyperemic; other blood vessels within the tuberculous tissues possessed unusually thick walls and greatly narrowed lumen. In other vessels the walls were not only hyperplastic but also infiltrated, the lumen greatly narrowed by a proliferative endarteritis. Some vessels showed only a distinct, split, doubled or broken up elastica. Finally there were vessels with an entirely occluded lumen surrounded by a caseous granular mass much resembling a cheesy miliary tubercle.

While such profound changes in the spinal cord tissues did not set up inflammatory phenomena in the adjacent parenchyma, they did so to a marked extent in the spinal meninges, the pathologic phenomena in the latter presenting a striking contrast with those in the spinal cord tubercle. It can be seen that the latter constitute a dying, regressive or degenerative tuberculous process, while the meninges represent the same process in a young stage in the form of an abundance of hematogenous and histogenetic elements (fibroblasts). Both these groups of elements thus seem to be instrumental in the genesis of tuberculous lesions, ultimately leading to the formation of tubercles.

The dissimilarity in structure of the tubercles in the meninges and spinal cord is due to the *stage* of formation as well as to the *character* of the tissues harboring them. The importance of these two factors was brought out and conclusively proven by the experimental work of Fieandt (2) who was able to follow the genesis and gradual growth of a tubercle formation by numerous experiments on animals. The growth of the tubercle in meninges, in our case, showed principally as marked perivascular infiltration which was also in evidence in the miliary tubercles of the spinal cord. In the latter the infiltrating masses, mostly degenerated, have been surrounded by a great number of concentric rings of connective tissue much resembling the rings seen around the vessels in myelomalacia (3), sub-acute combined cord degeneration (4) and similar conditions. The connective tissue rings in the latter are productive or reactive phenomena, provoked by the presence of a great mass of gitter cells which must be removed from the organism as useless and foreign bodies. The removal, as pointed out elsewhere (3), is accomplished by way of the perivascular spaces whence they are carried to, and drained by, the sub-arachnoid space of the spinal cord. The same process evidently obtains in the case of solitary tubercles of the spinal cord. Here the foreign, useless elements are

not gitter cells, but tubercle bacilli[3] which provoke the reactive activity of the tissue as well as of blood elements. The former results in proliferation of the adventitial elements and connective tissue ring formation, the latter in a dense accumulation within these rings, or, which is the same thing, within the changed adventitial spaces. Thence they are shipped like any other foreign substance to the meningeal subarachnoid space where they provoke reactive phenomena in the form of a meningitis. The latter, thus, is not the result of the direct invasion of the meninges by the tubercle bacillus, as commonly thought (Bruns (5), Schmaus (6)), but is the result of the flow of the infected tissue fluids from the spinal cord towards the subarachnoid space. Such a mode of invasion of the meninges in the case under discussion is much more probable than a direct invasion, for as Fig. 2 shows, the tubercle is separated from the meninges by a zone devoid of tuberculous masses.

The flow of contaminated tissue fluids from the adventitial spaces away from the cord is at least partially responsible for the lack of inflammatory phenomena in the areas adjacent to the tubercle. The

The conclusions that might be drawn from the pathologic study of this case are as follows:

1. A solitary tubercle of the spinal cord is the outcome of a local inflammation of the tissues brought on by a specific microorganism.

2. The inflammation provokes reactive phenomena on the part of the surrounding tissue elements, causing proliferation of the adpresence of powerful connective tissue and fibrous capsules around the tubercles is of course also largely instrumental in protecting the rest of the cord against the spread of the infection within its tissues. ventitial cells and of hematogenous elements (lymphocytes, plasma cells, etc.).

3. Both the tissue and hematogenous elements participate in the formation of the tubercle.

4. Like any other useless and foreign body, the contents of the adventitial spaces are drained by the subarachnoid space.

5. Landed in the latter, they provoke various inflammatory reactive phenomena on the part of the pia arachnoid, producing a meningitis.

6. The latter is a secondary process, and not due to direct invasion of the meninges by the tubercle in the spinal cord.

7. The draining of the disintegrated material by the subarach-

[3] Tubercle bacilli could not be found in the specimens of this case.

noid space as well as the powerful connective tissue rings around the tubercle are responsible for the preservation of the rest of the spinal cord and the absence of myelitis.

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APPENDIX

Abstracts of Cases of Solitary Tubercle of the Spinal Cord, Collected from the Literature (Dr. Wm. Thalhimer)

I have been able to find sixty-seven reported cases which appear to be definitely proved cases of solitary tubercle of the cord. Abstracts of fifty-eight of these are appended below.

Herter in 1890 collected twenty-five cases. Schlesinger in 1898 collected sixty-two cases. It may seem strange that Schlesinger collected sixty-two cases in 1898, and we have been able to find only five more additional cases. The explanation probably is that Schlesinger's report included ten unpublished cases of his own and fourteen of his personal cases, only seven of which we could find. Also, Schiff and Gerhardt's titles indicate that each reported two cases. In both instances only one case was found to be that of a solitary spinal cord tubercle. Including the ten unpublished cases of Schlesinger, and the seven personal cases which we could not find, the total number of cases in the literature can be placed at eighty-four.

Lebert (Handbuch der Prakt. Med., 1859) reports twelve cases. We do not know how many are his personal cases as this edition was not available, and later editions do not include this information.

All abstracts are from original sources, except Eager's case, cited

from Gerhardt's *Handbuch.* The best articles are those of Herter, Schlesinger, Veraguth and Brun, and Doerr.

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Although only eighty-four cases have been reported it will be seen that this lesion is not so uncommon but that it merits consideration in any case with the symptoms usually associated only with a primary neoplasm of the spinal cord. The similarity in the symptoms in all these cases is striking, as is also their sequence. It is hoped that this catalogue of the reported cases of solitary spinal cord tubercle will serve to draw attention to this condition. Early recognition and operative removal of the solitary tubercle offers the possibility of cure in some cases.

Veraguth, O., and Bruns, H.

Case 1. "Subpialer, makrosopisch intramedullarer Solitartuberkel in der Höhe des vierten und fünften cervical segments; Operation." *Genesung, Cor.-Bl. f. Schweiz. Aerzte, 1910, XI, 1097; 1147.*

Male, aged thirty-two years. *Past history:* Four years previously patient developed pulmonary tuberculosis and a tuberculous abscess of the thumb.

Present Illness: Stiffness and pain in nape of neck, greater on the left side, falling asleep of left, and then right arm, loss of power in left and right arms. Strange sensations and weakness of rest of body.

Physical Examination: Pulmonary tuberculosis, vertebral column negative on examination and x ray. The essential points of a careful neurological examination showed the follwing important fidings: marked sensory disturbances, anesthesia in left arm, loss of all control except a few finger movements, tendency to contracture; fibrillary twitchings of muscles of left leg, marked weakness, sensory disturbances, less in right arm, with power diminished, as in left arm. Gait is that of a spastic hemiplegic. Left phrenic nerve paralyzed, and this was confirmed by x ray. Spinal fluid—clear,

showed a few lymphocytes, no globulin. Wassermann reaction negative.

Operation: Laminectomy of second, third and fourth cervical vertebrae. At the level of the third cervical a diffuse globular swelling was found in the cord with increased consistency—no sharp demarcation. There was a yellow spot a few millimeters in diameter which was followed into the medulla, where a tumor was found which shelled out cleanly. The tumor measured 9.5 by 11.5 by 17 mm.

Diagnosis: Encapsulated solitary tubercle. *Post-operative course:* Patient slowly made a complete recovery and resumed occupation of telephone operator.

Veraguth, O., and Bruns, H.

Case 2. Weiterer Beitrag zur Klinik und Chirurgie des intramedullären Konglomerat tuberkels. *Corresp. f. Schweizer Aerzte, 46: 385–408 and 424–430, 1916.*

A tuberculous thirty-six year old physician exhibited signs of Brown-Sequard and Horner syndromes preceded by spontaneous pain in the dorso-cervical region, pain and tremor in left hand. Two operations had been performed, and at both solitary tubercles have been located in the lower half of the cervical region of the spinal cord (one at the sixth and seventh cervical segments, another at the fifth cervical). The post mortem in addition showed tubercles in the pons, cortex, seventh and eighth cervical roots and the posterior horn of the fifth cervical segment.

The authors claim that once it is possible to diagnose clinically a solitary tubercle and determine its exact localization, an operation should be recommended, provided the tubercles are not multiple.

Richard Wagner.

Zur Diagose des Solitär-tuberkels der Medulla spinalis, *Zeitschr. f. Kinderheilkunde, 25: 322, 1920.* (*Originalien.*)

An epileptic mentally deficient fourteen year old boy entered the hospital complaining of severe headaches, vomiting, pain in the sacrum, right hip and knee joints. The right leg was adducted, flexed and markedly atrophied. There were clinical and serologic manifestations of a meningitis. The skin was covered with tuberculous sores. The post mortem revealed miliary tuberculosis with involvement of the bronchial glands, lungs, liver, kidneys, conglomerate tubercles of the upper lobes of the lungs, corpus striatum, cerebellum and of the lower lumbar region of the spinal cord.

Zunker.

Tuberkel in der grauen Substanz der Lendenanschwellung, mit Verlust der Schmerzempfindung, *Zeit. f. Klin. Med., I, 1880, 375.*

Male, age 31. Amputation of right leg for tuberculosis and complications. Neurological examination five weeks after amputation: positive findings confined to lower extremities. Complete flaccid paralysis of stump of right leg and entire left leg. Muscles irritable and contract on stimulation. Tendon reflexes not increased.

Loss of sensation on both sides up to inguinal fold. Temperature missing over same area, urinary and rectal incontinence. Pre-lethal recovery of power of movement in stump of right leg.

Autopsy: Tuberculosis of lungs, liver, spleen, kidney and brain.

Cord: In the upper lumbar portion a round, three cm. long, bean sized tubercle replaces the gray matter. Microscopical report not given.

de Jonge, Dr.

Tumor der Medulla Oblongata; Diabetes Mellitus, *Arch f. Psych. u. Nerv., XIII, 1882, 658.*

Male, age thirty-seven.

Three months ago cough, expectoration, pain in chest. Five weeks ago edema, ascites, chronic lung process, no neurological signs, no glycosuria. Later, absence of edema, ascites. Then, polydipsia, polyuria, glycosuria and finally, sudden right hemiplegia and coma. Course fatal four months after admission.

Autopsy: Brain—petechiae in medulla, otherwise negative. Medulla oblongata—a circumscribed, caseous tubercle, 15 x 7 x 5 mm. extending from lowest part of olive down to origin of first cervical nerve in the posterior horn. Tuberculosis of lungs, bronchial and mesenteric nodes.

Sachs, B.

"A Contribution to the Study of Tumors of the Spinal Cord." JOURNAL OF NERVOUS AND MENTAL DISEASE, XIII, 1886, 647.

Male, aged thirty-two years.

Present illness: Four weeks prior pains in left shoulder, then left arm. Weakness of hand past week, skin puffy and glossy.

Physical Examination: Hyperesthesia and puffiness of left fingers and weakness of left hand, slight loss of power in arm; forearm and shoulder remain unchanged. Slight paresis, hyperesthesia of left leg and knee jerk, increased ankle clonus. After seven weeks, changed from unilateral to bilateral, complete paraplegia of lower extremities, abdominal respiratory movements and right upper extremity also paralyzed, incontinence of urine. *Sensory:* General hyperesthesia of left side below level of third rib, then anesthesia. Anesthesia of right leg, trunk and right arm.

Autopsy: Tumor, hazel nut size, at level of sixth and seventh cervical vertebrae but adherent to meninges, with a caseous center and hard cortex which takes up the entire anteroposterior thickness of cord. Few small tuberculous deposits in pia in mid dorsal region. Myelitis above and below tubercle, no degeneration below area of myelitis. Solitary tubercle of cord, pulmonary and intestinal tuberculosis, general miliary tuberculosis.

Marfan.

Tubercle Solitaire de la Moelle siegant au niveau des deuxième et troisième paires sacrées, Semaine Médicale, XVII, 1897, 92.

Male, aged three years. Sudden spastic, incomplete paraplegia at twenty-six months. Exaggerated knee jerks, slight muscular

atrophy, cyanosis of extremities, no pain or sensory disturbances, gluted bed sores, retention of urine. Fatal.

Autopsy: Solitary tubercle at the level of the emergence of the two to three sacral nerves.

Aniel Rabot.

Tubercule Primitif de la Moelle: Meningite Tuberculeuse Secondaire, Tuberculose, Concomitante des Ganglions Bronchiques de la Pleure, du Poumon, du Foie, de la Rate et du Rein Droit. Lyon Médical, LXXXVIII, 1898, 605.

Male, aged nine months. Paralysis of left leg, and diarrhea. Symptoms of meningeal irritation. Left leg flexed and adducted, shortened, atrophy and loss of power, no loss of sensation.

Autopsy: Basilar meningitis. The left side of the lumbar enlargement is occupied by a mass of tuberculous tissue with caseous center; easily enucleated. Tuberculosis of lungs, pleura, spleen, liver and right kidney.

Gouraud, F.

Tubercule de la Moelle Épinière, Bull. Soc. Anat. de Paris, 1902.

Male, aged twenty-six. Advanced pulmonary tuberculosis, pain and weakness in left leg, followed by complete paraplegia. Reflexes normal, marked sensory disturbances, incontinence of urine and feces.

Autopsy: Pulmonary and renal tuberculosis. The brain showed quiescent tubercles in various places. In the cord, 9 cm. above conus, a caseous tubercle 1 cm. in diameter was found replacing the left posterior portion.

Hunter, W. K.

"Case of Tubercular Tumour of the Spinal Cord in a Child Two Years Old." *Brain,* XXV, 1902, 226.

Male, aged two years. Internal strabismus of right eye, head turned to left and somewhat rigid. Right arm shows complete flaccid paralysis. Right leg shows no voluntary movement and slight rigidity. Left leg has slight movement. Knee jerks exaggerated, right greater than left, bilateral ankle clonus, plantar reflex absent. Disturbed sensation over arms, trunk and legs.

Autopsy: Pulmonary tuberculosis, tuberculous meningitis. In the cervical cord, extending from the second to the seventh cervical vertebra, is a caseous nodule 1½ x 3 cm. in size.

Luce.

Ueber Tuberkulose des Zentralnervensystems (Case reported before the Biologische Abtheilung des ärztlichen Vereins, Hamburg, Feb. 17, 1903), Münch. med. Woch., 1903.

Male, aged twenty-two years. Cough and expectoration; pain, then paralysis of left foot followed by paralysis of right leg and retention of urine.

Physical examination: Advanced pulmonary tuberculosis, flaccid paralysis of both legs, with total analgesia for touch and temperature

of both legs. Patellar reflexes increased on both sides, ankle jerks absent, Babinski present on right, absent on left.

Autopsy: Pulmonary tuberculosis, tuberculosis of mesenteric lymph nodes, and perforation peritonitis, tuberculosis of spleen. Solitary tubercle in meninges over left parietal lobe. Solitary tubercle in center of cord extending from ninth dorsal to first lumbar vertebrae, tubercle bacilli found.

Kolitz.

Ueber Rückenmarkstumoren im Kindesalter, Wien med. Blätter, 1885, Nr. 42, 1274.

Case 1. Female, aged one and a half years.

Family history: Mother has tuberculosis. Two brothers died of tuberculosis. Past history—treated for lues. *Present illness,* tuberculous meningitis, paralysis of left leg.

Autopsy: Tuberculous meningitis. Cord at the level of the sixth and seventh dorsal vertebrae is softened and widened. A 10 x 9 mm. tumor in left side of cord, with caseous center, cortex transparent, slightly red, studded with small nodules. The tubercle replaces and compresses almost the entire diameter of the cord.

Case 2. Female, aged five and a half years.

Scarlet fever complicated by acute nephritis, cervical adenitis. Pulse irregular, slow, later very rapid. Respiration rapid. Edema, anasarca, hyperesthesia of skin very marked. Rigidity of neck one day ante mortem. No motor or reflex disturbances except retention of urine.

Autopsy: Miliary tuberculosis of most organs, tuberculous meningitis. Cord: (1). Tumor 5 x 3½ x 4 mm. between dorsal and lumbar regions size of a lentil. (2) Tumor 10 mm. below this, 1½ mm. in diameter, round. Microscopical report not satisfactory.

Remarks: Acute tuberculosis complicated the exanthem. Strange that patient had no motor symptoms.

Gerhardt, C.

Zwei Fälle von Ruckenmarksgeschwülsten, Charite-Annalen, XX, 1893, 162.

Male, aged thirty-eight years. Pulmonary tuberculosis, paresis of left shoulder, arm and leg. Active reflexes of left side, sensation diminished on right side below third rib. Complains of coldness and deafness on right side. Cranial nerves: left palpebral fissure narrower, left angle of mouth elevated, uvula pulled to right, tongue pulled to left. Pains in left arm and neck. Course fatal four months after onset of neurological symptoms.

Autopsy: Pulmonary tuberculosis of lungs, liver, prostate, kidney, spleen and epididymis. Solitary tubercle in occipital lobe of brain. Tubercle in cervical swelling of cord occupying almost entire diameter.

Obolonsky.

Ueber einen Fall von Reuckenmarkstuberculose mit Verbreitung des tuberculosen Processes auf dem Wege des Centralcanales. Zeit. f. Heilkunde, IX, 1888, 411.

Male, aged one and a half years.

Clinical diagnosis: Paralysis of left abdominal parietes, paresis of both lower extremities, chronic enteritis, catarrhal bronchitis, bilateral bronchopneumonia.

Autopsy: Chronic tuberculosis of peribronchial, mesenteric and inguinal nodes, right lung, pleura, peritoneum, intestines and rectum, heart, left kidney and spinal cord.

At the dorso-lumbar junction there is a nodule, egg shaped 20 x 9, cavity in center, complete diameter of cord occuppied. Meninges normal.

Microscopical examination: Typical tubercle with caseous center, miliary tubercles on periphery, tubercle bacilli found.

Remarks: Small tuberculous miliary nodules were found in the central canal some distance away from the large tubercle. Since there was hydromyelia associated, and since the larger tubercle appeared older, Obolonsky believes that central canal acted as the mode of dissemination of tuberculosis.

Schiff, Arthur.

Ueber zwei Fälle von intramedullären Rückenmarkstumoren, Obersteiner's Arbeiten aus dem Institut für Anatomie und Physiologie, 2, 1894, 155. *Intramedullares Tuberkel des Rückenmarks.*

Symptoms: Motor and sensory paraplegia of lower extremities, bladder disturbances. *Clinical diagnosis,* compression myelitis.

Autopsy: Caries of vertebra, compression myelitis, pulmonary tuberculosis. In cervical cord unexpectedly there was found a tubercle, spherical, diameter .5 cm. in right half of cord replacing almost entire half, very little external change. Microscopical examination: Caseous center, round cell infiltration in perivascular lymph spaces.

Sudek, P.

Ein Fall von Tuberkelbildung im Rückenmark, Jahrbücher der Hamburgschen Staatskrankenanstalten, Bd. IV, 1893–4, 58.

Male, aged thirty-four years. Pulmonary and laryngeal tuberculosis, paraplegia, occasional involuntary contractures, diminished touch and pain sensation in both legs, also pains and formication, slightly diminished sensation in both thighs. Hyperesthesia marked over distribution of first lumbar nerve. No sensory disturbances of genitals, superficial and deep reflexes of lower extremities, increased ankle clonus. Other reflexes normal, normal electrical reaction, no bladder disturbances, first lumbar vertebra tender to percussion. Course nine months.

Autopsy: Tuberculosis of lungs, larynx and intestines. Spine and meninges negative. Cord: Upper lumbar, pea sized, yellowish gray, caseous nodule. Microscopical examination: Typical tuberculosis with tubercle bacilli.

Habershon, S. O.

Clinical cases; paraplegia; strumous tumor in spinal cord; hyperesthesia; phthisis, strumous disease of uterus, Guy's Hospital Reports, 1872.

Female, aged twenty-eight years. *Past history,* pneumonia three times, with pleurisy. *Present illness,* (1) Menorrhagia. (2) Aching pains in legs, more in right than left leg. (3) Numbness of sensation of pins and needles. (4) Finally complete paraplegia. Course: Muscles firm, reflexes easily induced, paralysis of sphincters, steady loss of motion and sensation in lower extremities, hyperesthesia of surface of legs, bed sore of sacrum opening into spinal canal, erysipelas at site of bed sore.

Autopsy: Round tubercle (cherry size) in lower part of dorsal cord, replacing nervous tissue, homogeneous, avascular, greenish yellow. Tuberculous lungs, intestines and uterus.

Chvostek.

Zwei Fälle von Tuberkulose des Rückenmarkes, Wien, med. Presse, XIV, 1873, 810.

Case 1. Male, aged thirty years. Drawing and dragging pains and muscular twitching; then paralysis, hyperesthesia, anesthesia and analgesia of left lower extremity. Right lower extremity likewise soon involved. Bladder paresis, spleen enlarged, lungs negative. *Course:* Death seven weeks after onset.

Clinical diagnosis: Acute myelitis.

Autopsy: Pea sized, hard, yellow nodule in lower thoracic region, with myelitis in vicinity. Pulmonary tuberculosis with bronchiectasis in left lung.

Case 2. Male, aged forty-three years. Disturbances in sensation and motion in left upper extremity, then left lower extremity, then right lower extremity, followed by rectal disturbances. Right upper extremity involvement, vesical disturbances, sexual functions and finally dysphagia. Sensory disturbances of extremities and later of trunk, pains in bones of extremities, girdle sensation (?). Reflexes not increased; paralysis of extremities and later trunk muscles (tonic), cramps in muscles, including neck muscles. Course eight months.

Autopsy: Cord—At the fourth and fifth cervical vertebrae there is a hazel nut sized tubercle, circumscribed, easily enucleated, soft, grayish yellow, caseous, with hemp seed sized cavity in center. Surrounding myelomalacia in left anterior horn ascending. Lungs, ileum and kidney show tuberculosis.

Mueller, L. R.

Ueber einen Fall von Tuberculose des oberen Lendenmarkes mit besonderer Berücksichtigung der secundären Degenerationen, Deutsch. Zeit. f. Nerv., X, 1896–7, 273.

Case 1. Female, aged forty years. Three years previous there were sharp pains in the extremities. Patient was in bed for one and a half years, after which pains disappeared, and patient could get about. One half year after this exacerbation with sensory dis-

turbances, no pains in lower extremities but sharp pains in upper extremities. For the past six months loss of abdominal sensation, vesical and rectal disturbances, diminished voluntary control of lower extremities, involuntary movements and twitchings in lower extremities.

Physical examination: General kyphosis. Motor paraplegia, contractures of lower extremities, disturbed sensation below umbilicus, knee jerks and ankle jerks present, no ankle clonus. Babinski present.

Autopsy: Thickening of dura between the fourth cervical and second dorsal vertebrae. At the level of the first and second lumbar vertebrae, ½ cm. deep in the cord. there is a spindle-shaped tumor 1½ x 1 cm. in size.

Microscopical examination: Tumor showed typical caseation and tuberculous granulation tissue.

Case 2. Male, aged forty-six years. Weakness of legs, retention of urine and bladder pains.

Physical examination: Definite signs of advanced pulmonary tuberculosis, gait is laborious but progress is possible, drags right foot. Active motion of right lower extremity and dorsiflexion of foot is impossible. Patellar reflexes, right greater than left, ankle jerks absent on both sides, cremasteric reflexes unequal. Abdominal reflexes, right absent, left weak. Pain and temperature sensation lost in the left lower extremity.

Autopsy: Bilateral pulmonary tuberculosis. A rounded mass 1 cm. in diameter is present in the cord at the level of the second thoracic vertebra. It is situated on the right side of the cord and only a small area of cord substance is left around the tumor on the left half. It is grayish and yellowish and distinct from the surrounding tissue.

Microscopical examination: A structureless mass, caseous in some areas, no giant cells, no tubercle bacilli demonstrated, tuberculous granulation tissue surrounding this. *Diagnosis:* Tubercle.

Oberndorffer, Ernest.

Ein Fall von Rückenmarkstuberkel, Münch. med. Woch., LI, 1904, 108.

Male, aged twenty-six years. Constipation and difficulty in voiding for two and a half months. Progressive weakness in left leg and severe pains in abdomen. Paralysis of both legs, sensory disturbances on left side of body between the costal margin and ileum. Reflexes of lower extremities first exaggerated and then lost.

Autopsy: At the level of the eighth to ninth dorsal vertebrae there is a yellowish white tumor occupying most of the cross section of the cord 1.3 x .5 cm. in size.

Microscopical examination: Conglomerate tubercle with caseous center, surrounded by many recent tubercles. In the periphery are many giant cells and tubercle bacilli.

Schultz, Friedrich.

Zur Symptomatologie und pathologischen Anatomie der tuberculösen und entzündlichen Erkrankungen und der Tuberkel des cerebrospinalen Nervensystems. Deut. Arch. f. klin. Med., XXV, 1880, 297.

Clinical diagnosis: Ileo-typhus. No headache or paralysis.

Autopsy: Miliary tuberculosis of lungs, liver, kidney and spleen. Tubercles (cherry stone size) in pia, dura and brain. Cord, dorsal region; in left lateral column a pea sized tubercle with caseous center, surrounded by round cell infiltration.

Elsberg, C. A.

"Laminectomy and Removal of Conglomerate Tubercle from the Substance of the Spinal Cord." *Annals of Surgery,* 1917, LV, 269.

Symptoms: (1) Loss of power in lower extremities. (2) Bladder and rectal disturbances. (3) Severe pain in lower abdomen. *Operation:* Removal of arches of ninth, tenth and eleventh dorsal vertebrae. *Pathological findings:* Small tumor 1½ x 1 cm. in substance of cord. *Microscopical examination:* Tuberculoma. Posterior root section three months after on account of spastic paraplegia. *Result:* Two years after operation marked improvement, patient regained control of bladder, walks around without support.

Bellange, G.

Note sur un Cas de Tubercule de la Moelle Épinière, L'Encéphale, 1885.

Male, aged thirty-six years. Left lower monoplegia with loss of reflexes, pains and temperature absent or disturbed in parts of left leg, touch almost intact. Ataxia, complete disorientation, general weakness, signs of pulmonary tuberculosis and cough.

Autopsy: Brain negative. Pulmonary tuberculosis. Cord; Upper lumbar region shows a tumor. Microscopical examination; in posterior half of left lateral column caseation, little secondary degeneration. Diagnosis; Tubercle.

Schlesinger, Herman.

Case 1. Female, aged twelve years.

Sudden onset, paresis of lower extremities, vesical disturbances, paralysis of right upper extremity, diminished sensation below umbilicus, greatly disturbed deep sensations, flaccid paraplegia, loss of knee jerks and ankle jerks, incontinence of urine and feces, choreiform movements. Course ten weeks.

Autopsy: Multiple tubercles in brain and brain stem. Meninges covered with gray exudate, solitary tubercle at level of fourth to sixth and eighth thoracic vertebrae and in upper lumbar region.

Microscopical examination: Typical caseation and giant cells.

Case 2. Female, aged thirty-five years.

Pains and contractures in left arm, paresis in both legs, incontinence of urine and feces, muscular atrophy of left upper extremity,

increased tendon reflexes of lower extremities. Course eight months.

Autopsy: Tuberculosis of lungs, pleura, kidney and liver, solitary tubercle in right occipital lobe, solitary tubercle at lower end of cervical swelling of cord. It occupies the left half and is a round, caseous tumor, the size of a small nut.

Case 3. Female, aged sixty-two years.

Clinical diagnosis: Tumor of spinal medulla. History not given.

Autopsy: In the left side of the cervical cord, at the level of the fifth to sixth cervical vertebrae there is a caseous mass 2½ mm. in diameter.

Diagnosis: Tubercle of the cord.

Case 4. Male, aged sixty-six years.

No clinical history, only autopsy findings obtained.

Autopsy: Chronic peri-encephalitis and atrophy of brain, chronic internal hydrocephalus. A pea sized solitary tubercle with central caseation found in the cord at the level of the fifth to sixth thoracic nerves.

Case 5. Male, aged thirty-nine years.

Clinical diagnosis: Myelomeningitis, no further data obtained.

Autopsy: Pulmonary tuberculosis, tuberculous meningitis, tubercle in the optic thalamus, solitary tubercle at the level of the second to third lumbar vertebrae, replacing most of the cord.

Case 6. Male, aged fourteen years.

Pains and rigidity of neck for months, atrophy of muscles of left shoulder girdle and hand. Hyperesthesia of entire body, retention of urine. Course three months.

Autopsy: Spondylitis of fourth cervical vertebra, cerebral and spinal tuberculous meningitis. Central caseous tubercle of the cord at the level of the sixth cervical vertebra.

Schlesinger, Herman.

Ueber Zentrale Tuberculose des Rückenmarkes. Deutsch. Zeit. f. Nerv., VIII, 1895–6, 398.

Male, aged forty-two years. Onset ten weeks ago with dizziness, regurgitation of fluids through the nose, change in speech, difficulty in swallowing, pain in right side of face, pains and paresthesia in both upper extremities. For four weeks weakness of both upper extremities and right lower extremity; for the last week, urinary incontinence.

Physical examination: Infiltration of both apices of the lungs, palsy of soft palate. Vocal cords inflamed and show slight paralysis, rigidity and tenderness of neck, upper extremities show bilateral muscular atrophy, the right greater than the left. Ataxia, weakness of shoulder and back muscles, the accessory muscles used in respiration. Lower extremities show diminished strength, more in right than left, sensory disturbance, ulnar side of right hand shows diminished touch and pain sensation. Ring of temperature, hyperesthesia about neck, paresthesia to temperature below this. Left leg shows almost complete loss of temperature sensation on exten-

sor surface and loss of epicritic temperature sensation on flexor surface. Diminished sensation for passive motion in joints of upper extremities. Reflexes: Patellar exaggerated on both sides and bilateral ankle clonus present. Abdominal reflexes absent, cremasteric diminished, mentality clear.

Autopsy: Chronic, bilateral pulmonary tuberculosis with pleurisy of left side, tumor of cervical cord at level of second to third cervical vertebrae. This is a circumscribed, homogeneous mass, sursounded by a rim of granulation tissue rich in giant cells.

Observation: The central origin of the tubercle in the gray substance of the cord is indicated by the symptom-complex.

Mader.

Ein Fall von Tuberkulose des Halsmarkes, Wiener, medizinische Presse, XX, 1879, 1056.

Male, aged twenty-nine years. *Symptoms:* 1. Spastic paraplegia and pains, severe cramps in legs. 2. Later, coughts, sweats, hoarseness. 3. Prelethal right hemiplegia. *Physical examination:* Knee jerks exaggerated. Voluntary motion reduced to minimum, diminished sensation in extremities and half way up trunk. Temperature sensation normal, hyperesthesia in upper half of trunk and upper extremities. Course one and a half years.

Autopsy: 1. Pulmonary tuberculosis of lungs with cavities. 2. Recent tubercles in lower part of ileum. Cord, level of seventh cervical vertebra is studded with yellow masses in posterior part of cord. Area of softening immediately below this, another in lower part of thoracic region.

Serre.

Observations et reflexions sur l'état de nos connaissances à l'égard de quelques lésions organiques, Gaz. Méd. de Paris, 1830, *Tome, No.* 7, 57.

Male, aged forty years. "Sudden loss of perspiration." Pains in lumbar region and hypogastric region. Retention of urine. Paraplegia, numbness of lower extremities.

Autopsy: Pleural adhesions, hepatization of lungs, vertebra and membranes normal. Cord at level of fourth and fifth lumbar vertebrae: The entire width of cord is replaced by a "rosary" of large yellow tubercles.

Gull, W.

"Case of Paraplegia," Guy's Hospital Reports, 1858.

Age of patient eight months. Paresis of right and left arms, rigid neck, retracted head. Atrophy of muscles of right and left arms for two and a half months and spastic contractures. Course fatal in seven months.

Autopsy: In the lower part of the cervical swelling is a tubercle replacing the cord tissue.

Eisenschitz, J.

Tuberkel des Rückenmarks. Jahrb. für Kinderheilkunde, 1870, 224.

Male, three and a half years old. Headache, loss of appetite, sleeplessness, both lower extremities paralyzed. In twenty-four hours sudden incontinence of urine. Six weeks later same symptoms and analgesia below the level of the eighth dorsal, front and back, no anesthesia. Hyperesthesia above eighth dorsal. Reflexes active in paralyzed lower limbs, occasional convulsive movements.

Autopsy: Milky thickened pia at base of brain, with small nodules matted together in places. Two caseous nodules in right lobe of cerebellum. Cord at lower level of dorsal region a yellow, caseus nodule, the size of a pea. Tuberculosis of bronchial nodes, lungs, intestines, spleen, liver and kidney.

Eager.

In Gerhardt's *Handbuch der Kinderkrankheiten,* Bd. V., Koht's *Tumoren des Rückenmarks,* 420, Gottschalk's *Sammlung,* 1838.

Male, aged thirteen years. One year previously left cephalalgia, stammering pains, in left side neck. Pains followed first by weakness, and then paralysis of right leg and arm. Slight decrease in sensation in paralyzed limbs, burning pains in joints of affected limbs. Six months prior, cough, expectoration, dyspenea, right facial palsy, pains and contractios of muscles of neck, and of right limbs, itching, burning pains from the neck to the foot on right side.

Autopsy: Two and one half inches below pons there is an area of softening in which are two bodies, round, yellowish green, with gross appearance of tubercles. The vicinity is perfectly normal in appearance and consistence.

Ollivier.

Maladies de la Moelle Épinière, vol. 2, 1837.

Case 2. Female, aged twenty-four years. Convulsive movements of extremities three days before death, especially the right side. Incontinence, contracture of upper extremities, sensation preserved. Few hours ante-mortem there was paralysis of right arm. Physical signs of pulmonary tuberculosis.

Autopsy: Brain, negative. Cord: In the lower part of spinal medulla below the pyramidal eminences and olives there is a round pea sized body circumscribed and encysted, a tubercle, opaque and yellowish white.

Case 2. Male, aged sixty-three years. Died of pneumonia, had given history of epileptiform attacks for fifty years.

Autopsy: Negative except for two tubercles of the spinal cord, the size of hazel nuts, adherent, encapsulated. Vicinity normal in appearance.

Case 3. Female, aged ————————. Nervous phenomena at each menstration, globus hystericus. Meningitis which was fatal.

Autopsy: Basilar meningitis, spinal medulla shows a nut sized tumor, hard and filled with tuberculous, softened material. Pulmonary tuberculosis with cavities.

Case 4. Male, age unknown. Epilepsy since infancy. Acute meningitis, which was survived, followed by weakness and right hemiplegia. Died in course of delirium.

Autopsy: Brain and meninges, negative. Cord: Between the first and seveth vertebrae the cord is softened. In the midst of the softening there is an elongated tubercle, encapsulated and caseous. Other organs negative.

Case 5. Male, aged fifty-four years.

Past history: Hip disease, followed by ankylosis. *Present illness:* Lumbar pains. There is a soft tumor just beneath the inferior angle of the left scapula. Pain and numbness in the left arm, constipation, tenesmus and incontinence, loss of power and sensation of lower extremities, but some temperature sensation retained, retention of urine. Ataxia, convulsive movements of lower extremities, bed sores.

Autopsy: Brain and meninges, negative. External to the lumbar portion of the dura, white, caseous plaques, which can easily be raised off. Between the twelfth dorsal and first lumbar there is a tubercle, the size of an olive. No surrounding changes. Vertebrae normal. In the vertebral gutters there is pus (explains tumor below scapula).

LeBoeuf.

Tubercule de la Moelle Épinière. Journal de Médecine, de Chirurgie et de Pharm. 97, 1895, 401.

Male, aged thirty-nine years. Pulmonary and laryngeal tuberculosis.

Central nervous system. Paresis of right side of body; sensation, including deep sensation, diminished. Tingling, then pains of right extremities, spasticity of right side, temporary ptosis of right lid, right nystagmus, right pupil dilated, tongue turned toward right, no vertebral tenderness, no visceral reflex disturbances.

Autopsy: Pulmonary and laryngeal tuberculosis. Central nervous system—Macroscopic tubercle in upper part of cervical cord and lower part of spinal medulla, in gray substance of right half of cord just anterior to the posterior commissure, occupying the posterior part of the central gray substance. Microscopical examination: Tubercle, caseous center.

Chiari.

Demonstration von Rückenmarktstuberkel in Wanderversammlung des Vereins für Psychiatrie in Wien. Neurol. Zentrabl, Oct. 1895. No case histories. Demonstration of specimens which were discovered post mortem and caused no symptoms ante mortem.

Jolly.

Ueber tuberkulose Rückenmarkserkrankungen (Report of case before the Gesellschaft der Charité-Aerzte in Berlin). *Muenchener medizinische Wochenschrift,* vol. 49, 1902, p. 2026.

Symptoms: (1) Flaccid paralysis. (2) Muscular atrophy. (3) Reaction of degeneration, tendon reflexes retained, symptom would come and go suddenly. Jolly demonstrated specimen of solitary tubercle from substance of cord at level of second lumbar vertebra.

Rystedt, G.

Ueber einen Fall von Solitärtuberkel im Rückenmark mit Nebenbefund von sogenannter artifizieller Heterotopie desselben, Zeit. f. klin. Med., LXIII, 1907, 220.

Male, aged twenty-five years. Hoarseness, paresis of right leg, pulmonary tuberculosis and tuberculous meningitis, paralysis of abdominal muscles. Abdominal reflexes absent on left, weak on right, cremasteric and anal reflexes absent. Lower extremities show spastic paraplegia, more marked in right leg. Knee jerks sluggish, ankle jeks equal on both sides. Bilateral Babinski, no ankle clonus. Dissociation of sensation as high as tenth dorsal vertebra. Course two and a half months.

Autopsy: Pulmonary tuberculosis, tubercle of cord at the level of the fifth dorsal vertebra, 24 x 8 mm., sharply demarcated with central caseation, periphery of this rich in giant cells and tubercle bacilli.

Thorel, Ch.

Grosser Solitärtuberkel des Rückenmarks. Deut. med. Woch. XXXIII, 1907. 216. Demonstration of specimen before *Aerztlicher Verein* in Nurnberg, Nov. 21, 1907.

Female, aged thirty-one years. *Autopsy:* In cervical cord 13 cm. below the fourth ventricle there is a nacrotic solitary tubercle the size of a pigeon's egg. Tubercle bacilli could not be demonstrated. Patient died of advanced pulmonary tuberculosis. Other clinical or microscopical facts not given.

Mohr, R.

Ueber einen Fall von Tuberkulosa des Lendenmarks, Verhand. d. Deutsch. Path. Gesellschaft, Zentral Bd. f. allg. path. Anat., 1909.

Male, aged twenty years. Cough, enlarged lymph nodes, pains in back and lower extremities. Paresis of lower extremities, bladder disturbances. Left lung showed tuberculosis. Flaccid paralysis of both lower extremities, knee jerks, ankle jerks and plantar reflexes increased. Sensation lost below the knees.

Autopsy: Generalized tuberculosis. The lumbar enlargement is abnormally large and shows central caseation. Microscopical examination showed a conglomerate tubercle.

Doerr, Carl.

Zur Kenntnis der Tuberkulose des Rückenmarks, Arch. f. Psych. IL, 1911–12, 406.

Case 1. Male, aged eleven years. Sudden onset with headache and fever. Presented picture of meningitis or typhoid, was delirious and unconscious. Slight nystagmus, ptosis of left eye, slight left abducens, paralysis. Physical examination otherwise negative. Course fatal in a few days.

Autopsy: Generalized miliary tuberculosis, tuberculosis of meninges of cord and purulent exudate at base of brain. Pea sized tubercles in left cerebral hemisphere, a pea sized nodule in the cer-

vical cord more confined to the gray substance, with the consistency increased.

Case 2. Male, aged twenty-two years. Pains in right knee followed by weakness and atrophy of right leg, then by cramps and paralysis. Finally, paralysis of left leg and atrophy, incontinence of urine and feces. Course fatal in two and a half months. Diminished power in right arm, bilateral paralysis and atrophy of both lower extremities. Sensation lost in right lower extremity, diminished in left. Knee jerks, ankle jerks and ankle clonus absent on both sides.

Autopsy: In the lower cervical and upper thoracic cord there is a circumscribed tubercle 9 mm. in diameter.

Microscopical examination: Typical tubercle, extensive tuberculosis in lungs, pericarditis, and tuberculosis of right knee.

Hayem, George.

Observation pour servir à l'histoire des tubercules de la moelle épinière, Arch. de Phys. norm. et path., V, 1873, 431.

Male, aged thirty-seven years. *Symptoms:* Paraplegia, inferior; vesical paralysis. *Physical examination:* Complete loss of motility and sensation in both lower extremities, which are flaccid, loss of reflexes, bed sores. No spinal pains nor pains in affected extremities. Later, fever, abundant mucous râles in chest.

Autopsy: Tuberculosis of lungs, epiglottis, cervical lymph nodes and small intestie. In upper lumbar region of cord a hard, greenish central tumor surrounded by softened substance.

Microscopical examination: Cysticercus cysts of brain. Cord; Tubercle 14 mm. in diameter 8 cm. from the beginning of filum terminale, caseous, surrounded by ring of softened tissue. Anterior roots at level of tubercle show atrophy. Above tubercle, interstitial myelitis. Below tubercle diffuse meningo-myelitis, interstitial myelitis, secondary descending sclerosis.

Lionville.

Nouveaux exemples de lésions tuberculeuses dans la moelle épinière, Arch. gen de méd. I, 1875, 92.

Male, aged twenty-six years. Tuberculous cachexia, generalized tuberculosis) and symptoms of meningo-encephalitis and meningo-myelitis. Paraplegia and sacral bed sores.

Autopsy: Pulmonary tuberculosis. Tuberculous meningitis, cord, meninges in the cervico-dorsal region show miliary tubercles; tubercle replacing almost entire diameter of lower cervical region.

Herter, Christian A.

"A Contribution to the Pathology of Solitary Tubercle of the Spinal Cord." JOURNAL OF NERVOUS AND MENTAL DISEASES, XVII, 1890, 631.

Case 1. Male, aged twenty-eight years. Has had pulmonary tuberculsis and tuberculous epididymitis for a year. Now complains of spasmodic pain in lower extremities, loss of power and then paralysis, especially of the left leg, and hyperalgesia of both legs.

Physical examination: Showed apical tuberculosis, very active knee jerks, no ankle clonus. Course six weeks, with almost complete paralysis of left leg.

Autopsy: Showed generalized tuberculosis, three massive tubercles in the brain and a solitary tubercle of the cord at the level of the seventh and eighth dorsal vertebrae, occupying almost entire left half of the cord.

Case 2. Female, aged thirty-five years. Weakness and loss of power of both lower extremities, twenty days later complete paralyses and almost complete of left leg, headache, retention of urine.

Physical examination: Bilateral loss of knee jerks, areas of diminished sensation of lower extremities, bilateral diminution of hearing, delirium, rigidity of neck, right internal strabismus with dilatation of pupils and loss of light reflex. Course, one month.

Autopsy: Miliary tuberculosis of lungs, spleen, kidney, uterus and tubes, ependymitis. Spinal cord showed at the level of the third vertebra a spheroidal mass with a cheesy center. The entire size is ⅜ inch in diameter. Microscopical examination showed a conglomerate tubercle with tubercle bacilli present.

Scarpatetti, J.

Befund von Compression und Tuberkel im Rückenmarke, Jahrb. fur Psych., Vol. 15.

Male aged fifty years.

Symptoms: Pains in legs, deafness, paralysis of both lower extremities, motor aphasia with slow onset, constipation.

Physical examination: Pupils equal, left does not react to light, diminished hearing in right ear, right adhesive pleuritis, vertebral canal sensitive in lumbar and lower dorsal region. Lower extremities—right shows complete loss of power, left almost complete loss of power. Left knee jerk absent, right knee jerk normal, ankle jerks inconstant, no ankle clonus. Temperature sensation equal on both sides, singultus, incoherent speech.

Autopsy: Tuberculous meningitis. Body of the eighth dorsal vertebra contains an abscess and there is a peridural abscess at this level. Tuberculous pleuritis.

Microscopical examination shows complete transverse degeneration of cord at the level of the eighth to ninth dorsal vertebrae with slight thickening of meninges. At the level of the second to third lumbar vertebrae there is a tubercle in the left anterior horn made up of caseous material with caseation of the central canal at this level.

Krauss and McGuire.

The Journal of the American Medical Association Oct.–Dec., 1909, Vol. 53, p. 1911.

Male, thirty-six years old. Weakness and pain in chest; night sweats; left pulmonary tuberculosis; bilateral nodular epididymitis; exaggerated leg reflexes; loss of bladder control, spastic paralysis of both legs; loss of sensation below intermammiliary line. Lam-

inectomy of upper dorsal spine: Tumor 1½ x 2 cm. shelled out of cord about level of fourth vertebra; tumor firm. Microscopical examination shows giant cells and a few tubercle bacilli.

Diagnosis: Tuberculoma of cord.

Peter Bassoe.

Archives of Internal Medicine, April, 1918, Vol. XXI, pp. 519–530.

Male, aged thirty-five years. Girdle sensation and pain; numbness first of right, then left foot, gradually extending upwards. Finally, spastic paralysis of both lower extremities; exaggerated reflexes; almost complete anesthesia below level of eleventh intercostal nerve area.

General physical examination: Negative. Loss of bladder control.

Lumbar puncture: Clear fluid, cell count of three; globulin, positive Wassermann reaction negative.

Autopsy: Generalized tuberculosis; conglomerate tubercle at spinal cord level of seventh thoracic vertebra.

JUVENILE PARESIS ASSOCIATED WITH HYPOPITUITARISM AND SYMPATHICOTONIC TREND

Report of a Case*

By Theophile Raphael, M.D., and Sherman Gregg, M.D.

KALAMAZOO, MICHIGAN

The association of juvenile paresis, hypophyseal dysfunction and sympathicotonic trend, is sufficiently striking to warrant report, particularly in the light of the added significance lately accorded the association of lues and pituitary disorder by Weisenburg, Patten, and Ahlfeldt (1) who report a series of five cases of frank pituitary imbalance—essentially hypofunctional—in all of which organic syphilis was definitely present and, in two, congenitally so. The added incidence of well marked sympathicotonic trend is not only of interest from a purely endocrino-autonomic viewpoint but, also, affords opportunity for speculation as to whether this relationship with neurosyphilis may not represent more than mere coincidence as in addition to the fact that various portions of the autonomic system are definitely known to be affected in lues, the view has recently been advanced by certain workers, notably Maloney (2) and Eppinger and Hess, (2) that vegetative disturbance may, conceivably, be regarded as largely responsible for the pains and crises, socalled, of tabes dorsalis.

REPORT OF CASE

R. B. (18532) white, male, aged eighteen, admitted to Kalamazoo State Hospital March 12, 1921.

Anamnesis

Family History.—The paternal grandfather died at the Kalamazoo State Hospital April 6, 1912, aged eighty-five, diagnosed psychosis with cerebral arteriosclerosis. A half-brother (paternal) died during early adult life of what is described as a wasting disease of a degenerative nature, preceded by excessive alcoholism. The father is living at sixty and is reported as having been peculiar for many years. At present he manifests ideas of personal exaltation, and is definitely dogmatic and pedantic. There is also indication of irrelevancy and circumstantiality in the stream of thought and possible paranoid trend. He has twice married and was divorced by both

* Presented before the Kalamazoo Academy of Medicine, May 10, 1921. (From the Kalamazoo State Hospital, Kalamazoo, Michigan.)

wives apparently because of his trying disposition. Venereal infection is denied but the blood Wassermann is four plus. Lumbar puncture was not obtainable and the neurological examination was apparently negative. The mother is living at fifty. She shows marked hyperthymic reaction, and complains of being nervous and of having suffered a nervous breakdown seven years ago. There is history of a still birth a year prior to the birth of the patient. The Wassermann on the blood is two plus. Examination of the spinal fluid was negative and there is no indication of neurological deviation.

Personal History.—The mother was weak physically during gestation having suffered an attack of pneumonia during this period. Labor was prolonged but without instrumentation. The patient weighed seven pounds at birth and the mother reports him as having been a fat baby, commencing to walk and talk at about fourteen months. There is history of chicken pox, measles, whooping cough, and several attacks of socalled croup during his early life and, since the age of seven, vision has been progressively defective and the body temperature noted as very unstable. Segmental adiposis was noted from early childhood. As a child the patient was bright, good natured and sociable, entering school at five and having advanced to the ninth grade by fourteen. He is reported to have been successful in his school work until about this time when the onset of a gradual but progressive change in his disposition was noted. He was soon remarked to have become very nervous, seclusive, generally undependable, resentful of discipline and stubborn, and to have lost all interest in school work. In December, 1917, the patient suffered what is described as a severe attack of influenza, following which there was remarked definite accentuation of the segmental adiposis and increased nervousness. Treatment at this time, presumably opotherapeutic, resulted in a substantial loss of body weight, about thirty pounds. From this point on, however, there was observed rapidly progressive mental deterioration marked by destructiveness and frequent crying spells, excitement attacks and increased restlessness, irritability and confusion. A certain vasomotor imbalance, as shown by frequent and marked flushing was also noted. The patient became continuously worse and was finally committed to the Kalamazoo State Hospital, March 12, 1921, following an especially severe excitement attack in which members of the family were threatened with violence.

Erotic libido and sex experience are strenuously denied, as is borne out also by the mother's statement, and there is no evidence of alcoholism or drug usage nor history of convulsions, snuffles or enuresis.

Examination.—Physical examination shows the height to be five feet five inches and weight 146 pounds. The body is very well nourished and definitely of the typus femininus with genu valgum, segmental adiposis (neck, cheeks, hips, abdomen, and breasts) and small hands with tapering fingers. The voice is somewhat high pitched and childlike. The lips are thick, the ears flaring, but not abnormally large, the palate typically of the Gothic type, and the teeth somewhat crowded, particularly upon the upper jaw, but showing no gross structural deviation save for impaction of the third molars. The skin is dry, warm and thin but of rather doughy consistency and shows moderately profuse acneiform eruption over the back and shoulders. There is definite hypotrichosis and the hair is of delicate texture and typically feminine in distribution, with low forehead hairline. The lungs and heart are negative. The blood pressure is 110 systolic and 80 diastolic and the pulse range is 80–90. Audition shows no disturbance save for slight diminution in air conduction on the right. Vision shows marked defect being 20/70 on the right and 18/200 on the left with marked contraction of the visual fields. Examination of the fundi reveals well marked bilateral optic atrophy, particularly on the left. The testes are definitely hypoplastic and the penis small, with markedly redundant prepuce.

Neurological examination shows fine tremor of the extended fingers and tongue, which deviates very slightly to the left, and slight, irregular twitching of the lips on speech. The pupils are irregular, unequal ($L > R$), eccentric and react very poorly to accommodation and not at all to direct or consensual light. The deep and superficial reflex responses are all definitely hyperkinetic (particularly the corneoconjunctival and pharyngeal responses) but otherwise show no deviation. There is no evidence of sensory disturbance or incoordination nor indication of clonus, Babinski, or Romberg. Speech is defective showing bradylalia with definite slurring and elision, and handwriting is characteristically slow, awkwardly executed and marked by frequent elisions and mistakes in spelling.

Mental examination shows the patient to be euphoric, mildly expansive, slightly elated and restless, distractible, confabulative, childish, and somewhat confused with definite evidence of general deterioration in all psychic processes, particularly in the ideational and mnemonic fields as shown especially by defective orientation, poor judgment, shallow thought, and uncertainty of memory, particularly for recent events. Psychometric examination (Stanford revision of the Binet-Simon test) shows a mental age of 8 $\frac{3}{12}$ years with an intelligence quotient of 51.

Röntgenological examination (Dr. A. W. Crane and Dr. J. B. Jackson) shows undersized sella turcica but no evidence of internal hydrocephalus or increased intracranial pressure. The hands show tufting of the distal phalanges but no essential epiphyseal change and there is no evidence of persistent thymus.

Laboratory examination (Dr. F. C. Potter) shows a four plus Wassermann reaction on the blood. Examination of the spinal fluid

shows a two plus Wassermann reaction; Nonne-Apelt reaction phase 1 and 2, four plus; pandy four plus; moderate reduction of Fehling's solution; 46 lymphocytes; colloidal gold 5533333210; and mastic 5554443210. The urine is negative save for slight volume increase, 1875 c.c. plus loss at stools. Examination of the blood shows: hemoglobin 77 per cent.; erythrocytes 4,525,000; color index 0.85; leucocytes 14,000; polynuclear neutrophiles 83 per cent.; small lymphocytes 8; transitionals 9; eosinophiles 0.

Endocrine and vegetative examination shows marked increase of sugar tolerance (Janney and Isaacson) (3) as follows:

Fasting level	0.101
One-half hour after ingestion of glucose	0.125
One hour after ingestion of glucose	0.109
Two hours after ingestion of glucose	0.125
Three hours after ingestion of glucose	0.102

The basal metabolism (Jones) (4) was slightly decreased (−10.9 per cent.). The hypodermic injection of one ing of epinephrin hydrochloride, was followed by very marked tremor, pulse increase of sixty-five beats per minute and heavy glycosuria. The oculocardiac reflex showed inverted response with an acceleration of eight. There was noted no increased sensitivity to the hypodermic administration of pilocarpine (one eighteenth gr.), eserin (one-fourth mg.) or atropin ($\frac{1}{100}$ gr.). Temperature (mouth) shows a range of 97.6°–98.4°. The Sergent adrenal white line was noted as well as moderate dermagraphia.

Discussion

On analysis, the existence of general paresis of the juvenile type is readily established from the rather typical onset, characteristic mental deterioration with linguolabial tremor, dysarthria, handwriting defect, pupillary disturbance, optic atrophy, reflex hyperkinesia, and typical blood and fluid findings with evidence of congenital stigmatization and specific parental infection.

Pituitary hypofunction may be validly assumed on the basis of the general physical appearance, e.g., typus femininus with segmental adiposis, small hands, tapering digits, gonadal hypoplasia and hypotrichosis with typically feminine distribution and fine hair texture, childish voice, undersized sella turcica and markedly increased sugar tolerance with slightly reduced basal metabolism, erythrocyte count and hemoglobin content, and association with somewhat low vascular tension, slight polyuric tendency and low grade hypothermia.

It may be noted in addition that low forehead hairline, crowded dentition, thin doughy skin, and Sergent line, as reported by Weisenburg and his associates in their cases of associated lues and pituitary

dysfunction were also noted in this case, as well as indication of terminal digital tufting. There was, however, no indication of enuresis as determined in three of their cases, nor eosinophilia, lymphocytosis, or disproportionate torsoleg ratio as noted in all five.

The significance of the Sergent white line, present in this case, is of interest although somewhat obscure. From recent work by Kay and Brock (5) this sign appears to bear no relation to adrenal tone as formerly supposed. Its observance by Weisenburg, Patten and Ahlfeldt in their cases of combined lues and hypophyseal disturbance, and in our case, associated with well marked dermographia and sympathicotonic trend, affords indication that it might conceivably be regarded as a manifestation of general vasomotor imbalance, dependant possibly upon autonomic dysfunction, basic in turn to either, or both, primary disturbing factors, syphilitic infection and hypopituitary trend.

The existence of sympathicotonic trend may be inferred, positively, from the very definitely exaggerated sensitivity to epinephrin, inverted oculocardiac response, rapid pulse, warm dry skin, increased corneoconjunctival and pharyngeal responses, good nutrition, bright superficially placed eyes and general hyperthymic trend and, negatively, by lack of sensitivity to pilocarpine, eserin or atropin and absence of eosinophilia.

This association of sympathicotonic trend and pituitary hypofunction is somewhat unusual, particularly as it has been commonly reputed, as indicated recently by Langdon Brown (6), that the pituitary, with the adrenals and thyroid, comprises what might be termed a sympathicotropic triad; all three of these glandular systems being excited to greater activity by the sympathetic division of the autonomic nervous system and, in turn, stimulating this division to increased function. From this point of view, if such were the case, a diminished spmathetic tone or sympathicatonic trend, as it were, might have been anticipated in this instance rather than increased sympathetic tone, as actually determined. However, it is possible, that the presence of sympathetic hyperactivity, in this case, may be an indication of compensation-attempt on the part of the two remaining members of the triad (adrenals and thyroid) and the sympathetic, although such presumption is admittedly speculative.

SUMMARY

Report is made of a case evidencing, in significant relief, the association of a luetic process (juvenile paresis) with deficient hypophyseal functioning and sympathicotonic trend, affording indication of the importance of systematic vegetative and endocrine analysis in acquired and congenital syphilis, particularly where associated with nervous system involvement.

Grateful acknowledgment is made to Dr. Herman Ostrander, medical superintedent, for permission to study and report this case.

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PROGRESSIVE CEREBRAL HEMIPLEGIA: ITS PATHOGENESIS AND DIFFERENTIAL DIAGNOSIS*

By Alfred Gordon, M.D.

PHILADELPHIA

Under the term progressive cerebral hemiplegia is understood a condition in which a unilateral paralysis of cerebral type is established slowly and progressively but in sections, commencing either in the upper or in the lower extremity or else in the face. The pathological material in such cases has been found to present a great variety. Edema of a whole hemisphere, large areas of softening, obliteration (partial or complete) of the internal carotids, thrombosis of the Sylvian arteries, multiple foci of softening through arteritis of small bloodvessels in the cortex or centrally located; finally tumor of the brain—these are the anatomical conditions which have been observed by various authors in the form of hemiplegia under consideration. Before discussing further the pathogenesis of the condition the following cases are presented for consideration:

Case I.—Man aged fifty-five, with a history of a syphilitic infection at the age of thirty-five, commenced to suffer from attacks of vertigo several months previously. His heart was somewhat enlarged, the aorta presented a marked accentuation of the second sound; the blood pressure was 170 systolic. Urinalysis showed a faint trace of albumin. One morning after a more violent attack of vertigo than usual, he felt the left arm and hand become numb, he rubbed the limb with vigor to make it react; on the following day the arm became paretic. Gradually the paralysis became more and more pronounced. On the tenth day the left lower limb became similarly involved and finally the left side of the face became deviated to the right. The speech was at no time affected except toward the end, when the patient's mentality became greatly weakened. In addition to the hemiplegia there was also a total hemianalgesia in the left arm and leg but only a hypalgesia in the lower half of the face on the same side. The reflexes were all typical of a cerebral attack. The eyes were normal, with the exception of a slight limitation of their movement toward the left. The tongue was deviated to the left side. There was no difficulty of deglutition. The sphincters were normal. The patient's condition gradually grew worse, the paralytic state became deeper, the sphincters ceased to functionate, the patient became mentally dull and gradually a comatose state made its appearance. Death occurred on the twenty-eighth day.

* Read before the meeting of the American Neurological Association, May, 1921.

At autopsy considerable edema was present over the Rolandic area in the right hemisphere. Both ascending convolutions were pale and on palpation a softness of the tissue was felt. The soft consistency was particularly marked in the middle portion of the precentral convolution, but less marked in its upper third; the lower third presented the same consistency as the surrounding tissue. Transverse cuts revealed that the entire cortical layer was correspondingly softened and contrasted sharply with the normal tissue but the softening did not penetrate deeper and left the white substance untouched, except over a very thin layer immediately close to the gray matter. The basal ganglia remained intact. The most interesting finding is the condition of the right middle cerebral artery; at its origin where it leaves the internal carotid, it was found to be hard on palpation; a section of it revealed an almost complete obliteration of the lumen. Dilatation of the basilar artery was another interesting feature. A microscopical study of these arteries showed distinct evidence of endarteritis, which was probably of luetic origin, but on the other hand the small arteries distributed over the Rolandic area did not show any material changes. A histological study of the nerve tracts showed distinct degenerative changes with the Marchi method but very slight with Weigert's stain. Special emphasis is laid on the fact that the most pronounced softening of cortical tissue was in that portion of the Rolandic area which corresponds to the center of the arm, and it is to be recalled that the paralytic condition commenced in the arm.

CASE II.—Man aged sixty-three, an inveterate alcoholic, had had attacks of vertigo with severe headache for a number of years. After one of these attacks in which the vertigo was unusually severe he became unconscious. Fifteen minutes later he commenced the regain consciousness and it was noticed that the left leg was paretic. The reflexes showed an involvement of the motor pathway. Sensations to all forms were greatly diminished. The paralysis of the leg became more and more pronounced. Ten days later there was observed a gradual diminution of power in the left arm with an accompanying flaccidity. Shortly afterwards a slight deviation of the face to the right was noticed. The patient was under observation until he expired, thirty days later. During that period he presented a typical left motor hemiplegia with a diminution of sensibility to all forms on the same side. Gradually the sphincters became involvement. The mentality remained clear until the end. The patient's blood pressure oscillated from 200 to 160 systolic. The left cardiac ventricle was dilated.

At autopsy the findings were as follows: Both hemispheres were edematous with predominance over the right sensorimotor area. At this level a pronounced vascularization could be seen. The lower portion of this area was somewhat softer than the neighboring tissue. Inspection and palpation revealed a more or less solid consistency of the arteries over the convexity and at the base of the brain. Only in one place a nodular condition was detected, it was at the level of

origin of the right Sylvian artery. A section of the latter showed an almost complete obliteration of the lumen. Further examination showed that the ascending frontal convolution was more softened than the ascending parietal, a fact which probably has some bearing upon the difference of the degree of involvement of objective sensibility and motor disorder during the patient's life. The softening was only peripheral but it gained also in depth. A gross section showed an edematous state in the right hemisphere between the periphery and the basal ganglia. However a certain portion of the internal capsule and of the adjacent lenticula was found softened, but the knee and the upper part of the capsule, as well as the thalamus were intact. Histological examination showed marked atheromatous changes in many of the cerebral arteries, which were particularly evident in the internal layer of the vessel wall. It was unusually pronounced in the Sylvian artery of the level of the above mentioned obliteration. The cortical cells showed marked deformities with a certain degree of chromatolysis. As to the nerve fibers some degenerative changes were traced only with the Marchi methods.

CASE III.—Man aged sixty-five, during the last ten years of his life severe attacks of mild subjective sensory disturbances in his left hand and foot. They consisted of tingling with numbness followed by weakness in the left arm and leg. The first attack lasted a few hours, but each subsequent attack was longer in duration so that the duration of the last one was a whole week. While he always recovered from each seizure, the fifth which was the last left his left arm somewhat weak. Nevertheless this weakness did not interfere with his regular occupation which was clerical. About fifteen days later his left arm became totally paralyzed and this occurred after an attack of vertigo without loss of consciousness. Five days later the left leg became paralyzed and at the same time a deviation of the face toward the right was noticed. The paralysis became gradually deeper and deeper and presented the typical symptoms of cerebral motor hemiplegia. Sensations were but slightly involved. There were no eye manifestations and the sphincters were intact. The patient presented a high blood pressure 220 systolic. The heart was dilated and the second aortic sound was loud and musical. Arteriosclerosis was pronounced. On the twentieth day the patient's condition became suddenly worse, a comatose state set in and he expired.

Autopsy revealed a marked edema in the right hemisphere. The pia was thick and infiltrated so that when after a puncture the edematous fluid escaped, it collapsed on the surface of the brain. There was distinct softening on the Rolandic area and particularly in its median portion, more in the precentral than in the postcentral convolution. The softening encroached somewhat on the prefrontal lobe in the middle portion. The arteries of the convexity of the entire cerebrum as well as of the base appeared thick and on palpation they felt hard. A specially hard area was found in the Sylvian

artery at the level of its origin. A cut of that area showed an almost complete obliteration of its lumen. A number of cuts were made over other arteries as well as those of the base. Thickened walls were in evidence in the majority but no obstruction of the lumen was seen. Transverse cuts of the brain revealed that the softening penetrated through the entire thickness of the cortex. An area of softening was found in the right internal capsule back of the knee. The thalamus opticus was intact but a small area of the lenticula adjacent to the capsule was also softened. Microscopical examination showed besides cellular changes in the cortex also degenerative changes in the motor pathway more with the Marchi than with Weigert's method of staining.

CASE IV.—Man aged thirty-eight, complained of severe headache, vertigo and had frequent vomiting spells. The tendon reflexes were increased in the lower extremities, but no other abnormal reflex was present. The eyegrounds were negative for a long time. The condition remained unaltered during a period of four months. At that time the patient observed a gradually oncoming weakness in the right arm with a mild difficulty of speech. Examination revealed also a sensory disorder in the affected arm, consisting of a pronounced hypesthesia to all forms of sensations; the patient complained of a numbness in the fingers and of inability to appreciate objects; astereognosis was present. The paretic condition grew deeper and deeper when on the sixth day the right leg became paretic. Gradually a complete paralysis of the leg developed. The face was but slightly involved. The speech became more and more typical of motor aphasia. Soon the patient's eyes commenced to show symptoms. Diplopia occurred frequently. The eyegrounds showed a haziness of the media, optic neuritis rapidly developed on both sides. The headache became more severe, vomiting more frequent. Convulsive seizures appeared on the right side. A comatose state gradually set in and the patient expired in one of the convulsive attacks. At autopsy a gliomatous neoplasm was found in the left hemisphere involving the ascending parietal convolution and partly the ascending frontal close to the Rolandic fissure affecting their median portion.

CASE V.—Man, sixty-four years of age, after a prolonged period of vertigo there developed five months ago a sudden paresis, with a sensation of numbness in the right leg. At the end of seven days he regained considerable power. Nevertheless a certain awkwardness of gait remained. Two months later a similar condition appeared in the right arm and leg. The face was also seen to deviate towards the left. The paresis became gradually more and more pronounced so that at the end of the fifth month the patient presented a complete right hemiplegia. Presently there was not only paralysis on the right side but also motor aphasia. The sensations were diminished on the right side. All the reflexes were typical of cases with a cerebral damage. The patient gradually grew weaker. Diarrhea made its appearance. Coma and death followed. At

autopsy was found a softening of the entire posterior limb and posterior portion of the anterior limb also of the knee of the left internal capsule. The large arteries of the convexity and base of the brain were found hard on palpation.

The clinical aspect in the five cases presents common characteristics, viz., the paralysis developed slowly and gradually at first as a mere weakness in one limb, but this imperceptibly grows more and more profound until a complete and total hemiplegia is fully established. The paralysis may commence in one or another extremity. In three cases the onset was in the arm, in two in the leg. The face as a rule becomes involved simultaneously with the arm. Sensations were invariably involved. In the first case there was a total analgesia on the affected side, in the second case—great diminution, in the third and fifth hypesthesia to all forms of sensations and in Case IV almost complete abolition of the superficial sensations and astereognosis.

Special emphasis deserves the onset of the condition: In all the cases except Case II, there was no suddenness which is so frequently the case in apoplexy; a mild paresthesia with a weakness in one limb is most characteristic of the invasion of progressive hemiplegia. The prodromal period in the five cases presented a state of vertigo and the onset of the unilateral paresis was invariably preceded by an unusually severe vertiginous state.

The anatomical findings require special consideration. In the first three cases we see a marked edematous state of the cortex with deep softening. Total obstruction of the main artery supplying the cortex was in evidence. The area of softening and the apparently anemic appearance of it is in sharp contrast with the neighboring tissue which remains firm. Edema and softening penetrate the brain through the entire thickness of the cortex and involve partly the white substance. The edema uniformly found in each of the three cases over a limited region naturally suggested a vascular obstruction. Indeed in each of these cases obliteration was found in the Sylvian artery although at a different level, but near its origin. The obstruction was complete. In Case IV we deal with a gliomatous tumor which for a long time (many months) did not show marked symptoms of increased intercranial pressure, as evidenced by the absence of focal symptoms and eye manifestations. No edema of the surrounding tissue was observed. In Case V there was a softened internal capsule and again no edema. Except Case IV with tumor, in all the other four cases there was distinct and pronounced degenerative changes in the blood vessels.

In view of these anatomical data let us consider the pathogenesis of progressive cerebral hemiplegia.

In Cases I, II, III, and V we find during the patient's life evidences of endarteritis, viz., frequent attacks of vertigo with peripheral arteriosclerosis. Arteritis, symptomatic of localized edema, is a well known fact in pathology. The first consequence of interference with arterial circulation in complete or even partial closure of the lumen of an artery is a more or less pronounced stasis in the neighboring veins and a passive dilatation of the latter. The passive dilatation is facilitated by a vasomotor paralysis which is usually present in such cases. In the cases under discussion by virtue of arterial alteration partial obliteration was being produced very slowly and over a long period. The edematous state of the nervous tissue was consequently equally slow and according to the intensity and the seat of the edema corresponding symptoms made their appearance. When an obliteration becomes complete in an artery which irrigates a given region, edema is pronounced and total suppression of function in the affected area will be the result. In the case of tumor the mechanism of progressive hemiplegia finds its explanation first in the consistency of the mass and secondly in the gradual encroachment of the latter on the various centers of the Rolandic area. The softness of the neoplasm prevented a stormy onset with its usual abrupt or sudden development of paralysis, with or without loss of consciousness; it produced slight but progressive pressure on the important sensorimotor area with the result of a gradual and mild interference of function dependent on the involved portion of the brain. A paretic condition was the first and a complete extensive paralysis was the final step.

The five cases described here permit to draw this conclusion that progressive cerebral hemiplegia may be encountered in endoarteritis from arteriosclerosis, in obliteration of a large artery such as the middle cerebral and in tumors especially of gliomatous type. But in Case I, in addition to the arteriosclerosis incidental of the patient's age there was also a history of syphilis. The sclerosis of the blood-vessels may be considered in a causal relationship with lues. That syphilitic infection at any of its periods may produce paretic conditions in one limb or partial paralysis is a well known fact. It may also cause a paralysis in a portion of the body on one side and later on produce identical conditions in the remaining portions of the same side. I have in my possession facts of this order of a clinical order. I observed in the tertiary period of syphilis, as well as in

tabes, progressive cerebral hemiplegia precisely with the same characteristics as those seen in the cases described above. In fact in all instances of partial paralysis lues should be suspected and if the laboratory tests are all confirmatory, they should be managed accordingly. The recognition of this possibility is preeminently important as cerebral ischemia may be prevented if the preobliterating phase of arteritis can be handled successfully. Syphilis of the nervous system as a rule presents no difficulty of diagnosis. The accompanying changes in the reflexes, in the reactions, dimensions and form of the pupils, in the function of the ocular muscles, in the function of the sphincters—are all adequate enough in presuming a luetic state. Particular reliance however should be placed on the Wassermann reaction of the blood and spinal fluid, on the cytological state of the latter, namely lymphocytosis.

Partial and incomplete hemiplegia occurring abruptly without loss of consciousness, mostly bilaterally and commencing frequently in the upper extremities, soon showing improvement (but not recovery) and remaining flaccid, if ever reaching the state of contracture, is observed in aged individuals and it is due to a successive formation of lacunar foci in the cerebrum. This condition was first described by Marie, Ferrand, and Léri. The successive appearance of the symptoms may give the impression of a progressive hemiplegia as described above, but the occurrence in old age together with other evidences of pathological senility, such as speech disturbance and psychic changes, namely flaccidity, also the tendency to amelioration, the cilaterality of the motor disorder,—all these features will aid in building up the correct pathogenesis of the condition.

Progressive hemiplegia may occur in cases of aneurisms of the basilar artery. Such a case is reported by de Massary and Carton (*Bulletin de la Société Anatomique,* Juillet, 1901). The patient, aged forty-three, had at first a slight hemiparesis on the left side, face including. There was some dysarthria. The latter rapidly improved. Soon the paralytic condition commenced to increase and gradually became complete and profound. The speech disorder reappeared. A comatose state set in and the patient expired. At autopsy an aneurysm was found on the right side of the basilar trunk which was compressing the upper and internal third of the right side of the pons. A section through the latter showed that the aneurismal sac produced not only pressure but also and more so a disorder through the disturbed vascular supply causing a focus of softening in the middle cerebellar peduncle and in the right pyramid. The ad vitam

diagnosis was very difficult in view of absence of cranial nerve involvement: The oculomotor, facial and trigeminal nerves were all intact.

Progressive hemiplegia has been observed in cases of uremia and at autopsy an edematous state of the cortex with a localized predominance over the motor area was found. Whether the edema is due to the accompanying endarteritis frequently found in such cases or to the toxic action of the pathological urine, or else to both elements, one cannot be certain. At all events one must bear in mind the possibility of occurrence of a progressive paralysis in uremic states. However, the distinguishing features will be found, in brief, alternating phases of aggravation and retrogression of the paralytic phenomena.

A similar tendency to retrogression in paralysis is observed in diabetes in the course of which progressive hemiplegia is sometimes observed. It is very probably due to a vascular lesion produced by intoxication of diabetes. Analogous condition and pathogenesis have been observed in intoxications from other sources, such as saturnism, carbon monoxide, alcoholism.

Tuberculous meningitis is another affection in which a slow and progressive paralysis of the limbs on one side of the body is sometimes observed. Chantemesse was the first to call attention to it (*Thèse de Paris,* 1884). Here again a vascular disorder caused by the tuberculous process might be incriminated. It must be pointed out that here like in uremia the intensity of paralysis is liable to alternate in the course of the disease, but invariably it terminates by a complete and permanent hemiplegia.

In 1846 (*Medical Times,* London) Fletcher described a symptom-group under the name of ingravescent apoplexy which was subsequently studied among many other observers by Broadbent (*Medico-Chirurg. Transactions,* V. L, IX, 1876), Abercrombie, Thomas Watson, Mossé (*Gaz. hébdom. de Montpellier,* 1889) and Peuch (*Progrès Médical,* 1889). Pathologically the affection is characterized by a hemorrhagic focus situated between the striate body and the external capsule. The clinical picture is as follows: In the beginning there is usually a sudden and severe headache; the patient is pale, the body becomes cold, the pulse is feeble and the individual falls in syncope. Sometimes the initial symptom is mental confusion. The syncopal state is usually brief. After having regained consciousness the patient continues complaining of headache. After a more or less brief period the patient becomes incoherent and suddenly

coma sets in from which he never recovers. Paralytic symptoms may be or may not be present. If it does appear it usually develops slowly and by gradation so that eventually complete hemiplegia will ensue. In the latter case the resemblance to the clinical picture of progressive hemiplegia described above is striking. A careful analysis however will show fundamental differences between the two affections. In ingravescent apoplexy the paralytic symptoms may sometimes be entirely wanting. In cases in which they are present, there are always stormy manifestations characteristic of an apoplectic insult, viz., sudden loss of consciousness. Coma appears soon after consciousness has been regained and increases progressively. In progressive hemiplegia on the contrary, a comatose state appears as a terminal phase a long time after the hemiplegia has been established. Besides, the state of malaise with headache and vomiting described above as immediately preceding the syncopal state of ingravescent apoplexy is entirely absent in the syndrome of progressive hemiplegia. The difference between the clinical pictures of one and the other cerebral condition finds its corroboration in the anatomical findings: while in ingravescent apoplexy there is always a hemorrhage, in progressive hemiplegia there is an area of softening which may be caused by a multiplicity of lesions, such as we have seen in the beginning of this work, viz., endarteritis, obliteration of middle cerebral arteries, pressure from a tumor, aneurism of the basal arteries, a degenerative state of the arteries of syphilitic nature.

In 1899 Thomas and Long (*Comptes rendus hébdomadaire des séances de Société de Biologie,* No. 28, 1899, p. 768) report an anatomoclinical case resembling to some degree progressive hemiplegia under discussion. It was a case of a man aged forty-seven, with a history of syphilis at thirty-six. Seven years before his death there gradually developed a paresis of the right leg which eventually became permanently paralyzed. There was also a complete anesthesia in the leg. About a year later a paresis of the right arm made its appearance. Gradually spincter disturbances made their appearance and a year later the patient died, after an acute attack of pleurisy. At autopsy several plaques of sclerosis were found in the spinal cord. The condition in the opinion of the author reminds one of some of the lesions in spinal syphilis. Another similar case but without autopsy findings was described by Mills (*Journal of Nervous and Mental Disease,* 1900, 27, p. 95). In a man of fifty-two a gradual weakness and awkwardness developed in the right lower extremity. Eighteen months later an identical condition appeared

in the right arm. The face was also involved in its right half. The paretic condition of the two limbs did not increase for a long time and there was no sparsticity. The condition of the reflexes pointed to an involvement of the motor tract. The sensations were normal but atrophy of the musculature was present on the right side. The author expresses the opinion of the case being probably an example of a slowly increasing degeneration of the cerebral motor neuron system.

The two cases just reported present a progressive development of a unilateral paralysis, but the mode of onset and the course of the disease—the character of the paralytic symptoms, the termination and the absence of arterial manifestations, finally the autopsy findings in one of them,—all prove a fundamental difference with the syndrome of progressive cerebral hemiplegia described in the present contribution.

CURRENT LITERATURE

II. SENSORI-MOTOR NEUROLOGY.

6. BRAIN.

Von Monakow, P. UREMIA. [Schw. Arch. f. Neur. und Psych., 1920, 6, No. 2. J. A. M. A.]

Von Monakow recalls that there are no characteristic signs of the uremic nature of a hemiplegia or other clinical picture except the knowledge of existing kidney disease. He protests against the assumption that the residual nitrogen is a reliable index of kidney functioning, and also that edema of the brain alone is able to induce convulsions. For this, some toxic factor is indispensable. With mechanical retention of urine, cerebral focal symptoms are rare, and when they occur they are variable and fleeting. With chronic nephritis, uremic coma is liable to develop suddenly without any apparent special factors at the moment to bring it on. These and other data cited suggest that something beyond the mere retention of the elements of urine is responsible for uremic coma, some factor independent of the kidneys. This factor, he thinks, is the sudden yielding of the choroid plexus to allow passage of injurious substances. As long as the choroid plexus is normal, it serves as a protecting membrane to ward off toxic fluid from the brain. When it becomes abnormally permeable, the brain is flooded with the noxious elements circulatlating in the blood stream. He gives photomicrograms from two cases, showing the pronounced fibrous and other changes in the choroid plexus found after death in uremic coma.

Noica. COMBINED VOLUNTARY MOVEMENTS. [L'Encephale, 1920, June, Vol. 15, p. 390.]

In following the development of voluntary movements at various ages it is found that combined voluntary movements are the first to make their appearance. New born infants make combined movements with the entire body and of various members which seem to have neither sense nor utility. The first purposeful and limited movements appear at the beginning of the fourth month when the infant grasps for the mother's breast with its two hands. The first separate voluntary movements of the lower members appears in connection with attempts to walk when the infant has reached the age of one year. It is only later, however, that limited movements of the fingers or hands in the upper members or of the knee, foot or other articulations in the lower members make their appearance. But even in adults the tendency to make associated movements persists under some conditions. The same rule holds good of the face: If a child or uneducated person is told to close one eye the

whole side of the face is moved. The author agrees with Mueller's explanation of the mechanism of these combined and separate movements. The child comes into the world with a tendency to make symmetrical and identical movements and by education and exercise learns to single out the separate voluntary movements of the different articulations of the body. The author endeavors to answer the question on the basis of this mechanism why the combined voluntary movements reappear in certain cases of adult hemiplegia, but not in all. He finds the answer in the analysis of the movements of various patients examined by him. The sign of Strümpell, for example, is a combined movement partly modified by a predominant paralysis of the extensors of the last four toes with the relative conservation of the motility of the anterior muscles of the limb and of the long extensor of the great toe. In lesions of the pyramidal bundle the first movements to disappear in the lower membranes are the later acquired limited movements—in the case of Strümpell's phenomena the power of separately moving the great toe. Another paralytic examined by the author could not close the hand without bending the elbow, nor bend the elbow without closing the hand—which constituted the infantile combined voluntary movement. These combined movements are only observed in those patients who have preserved at least a part of their power of voluntary movements. The author concludes that combined movements are an economy of force while the dissociation of these movements, *i.e.*, their isolation by inhibiting other from setting in, represents a greater expenditure of force, a higher form of adaptation. The adult having a lesion of the pyramidal bundle destroying the powers of particular adaptations tends to have combined movements, therefore, rather than to dissociate them. [J.]

Ducroquet, C. Hemiplegia in Children. [Presse Méd., July 24, 1920. J. A. M. A.]

Ducroquet shows in this profusely illustrated article the gait with hemiplegia, and advocates active movements of the knee and hip joint as the best means to restore functional use of the muscles. They may have to be preceded by passive exercises to stretch the contracted muscles. The knees, for example, can be strapped to a board as the patient sits with his back against a wall or the straight back of a chair. The equinus deformity of the foot can be corrected in young children by an elastic, fastening up the tip of the foot. An appliance should be worn at night to maintain this correction. Tenotomy may be indispensable in the severer cases, but much can be accomplished by pressure on the metatarsus as the knee is flexed. This relaxes the triceps at its attachment to the femur. Holding this corrected position with a plaster cast, the muscle finally relaxes permanently and two or three casts complete the process. Healing is complete sooner if the knee is enclosed in the cast.

Mirallié, C. Blood Pressure in Hemiplegia. [Bull. de la Soc. Méd. des Hôp., June 25, 1920.]

Examinations of the blood pressure on both sides in sixteen women and four men with hemiplegia are here reported upon. The observer found the maximum pressure was usually lower on the paralyzed side, minimal was alike. Edema when present was referred to heart or kidney mechanisms rather than to central vasomotor disturbance.

Marie, Pierre, and Foix, Chas. Paraplegia with Contractures in Flexion of Cerebral Origin Due to Progressive Subependymal Necrosis. [Revue Neurologique, January, 1920.]

The patient, aged seventy years, suffered from a paraplegia with the legs in extreme flexion, which had developed gradually. There was marked dementia with spasmodic laughter. The upper extremities were practically normal. The knee and Achilles jerks were abolished. The plantar reflex was extension on the right. The reflexes of spinal automatism were present and marked. The anatomic examination showed a marked dilation of the ventricles on both sides but mostly upward and forward. The walls of the anterior horn were irregular and these irregularities appeared on section to be due to progressive subependymal necrosis with cicatrix formation. The necroses were so situated that they interrupted the fibers from the paracentral lobules on both sides, this causing the paraplegia. The mesencephalon was normal. The case shows that the typical paraplegia "en flexion" as described by Babinski, with dissociation of the tendon reflexes and the spinal automatism, may be due to cerebral lesions. [Camp.]

Davidenkof, Serge. Early Contracture of Reflex Origin (Syndrome Hormetonique). [Revue Neurologique, January, 1920.]

The syndrome hormetoniques is a name coined by the author from the two Greek words meaning "attack" and "tension."

In separating the hemiplegics who develop contractures early from those of late development, it is generally assumed that the former are due to irritation of the pyramidal tract. The author believes, however, that they are more on the order of reflexes resembling especially the reflexes of defense. In view of the fact that spasmodic contractures can occur from irritative lesions the author creates the new word to describe his observations. [Camp.]

Schott. Birth Injuries as a Cause of Infantile Epilepsy and Imbecility. [Arch. f. Gynäk., CXIII, 2, 1920.]

The chief factor in the etiology of convulsive seizures and imbecility in children is to be found in hereditary influences; injuries at birth play a very small part. An examination of over a thousand cases shows that

in only 3 per cent. of imebeciles, and just over 1 per cent. of epileptics, was injury at birth the chief circumstance to which the pathological condition could be attributed.

Laignel-Lavastine. Aphasia and Apraxia. [Bull. méd., March 20, 1920.]

In the report of a clinic the author's views on aphasia and apraxia are detailed. He divides aphasia into two groups, according to whether there is difficulty of interior language, and studies spontaneous speech, repetition, spontaneous writing, writing from copy and from dictation, comprehension of written and spoken words. The Proust-Wernicke-Lichtheim-Dejerine test, in which the patient is shown an object and asked to open and close the hands as many times as there are syllables in the word is reacted to by failure when the aphasia is intrinsic. This class is divided into two groups, aphasias of Broca, where the ability to articulate is lost, and aphasia of Wernicke, characterized by loss of comprehension. Extrinsic aphasias where there is no difficulty of the interior language are divided into four groups, pure motor aphasias, pure alexia, agraphia and pure word deafness. Three apraxias are classified, the ideational apraxia or apraxia of conception, ideomotor apraxia or apraxia of transmission and motor apraxia, or apraxia of execution. These disturbances are analyzed by tests of simple, reflex, expressive, description and transitive movements. To distinguish between apraxia and ataxia the ability of the patient to direct his thought toward an end is important. The ataxic patient does this hesitatingly and his conception of the end is correct. He can complete the action and improve it. The apraxic patient does not improve by repetition.

The lesion in ideomotor apraxia is localized in right handed persons in the left parietal lobe, more especially in the left supramarginal gyrus. A lesion of the left cerebrum determines a bilateral apraxia, predominating on the right. If the apraxia predominates or exists alone on the left, in a right handed person, there is also either a lesion of the corpus callosum or an associated lesion of the right cerebrum. Aphasia is a particular case of apraxia. Ideatory apraxia corresponds to dyslogia, motor aphasia to anarthria and ideomotor apraxia to aphasia. Motor aphasias are a species of apraxias. [Stragnell.]

Schupfer, F. Intermittent Hydrocephalus. [Riv. Crit. di Clin. Med., Florence, September 5, 1920.]

Recurring periods of hydrocephalus which had come on at 10 and continued to 44, at monthly or bimonthly intervals irrespective of menstruation. She had been pregnant nine times, bearing six childen. Intense headache, vomiting, dimness of vision, inability to stand lasted each a few days, but gradually subsided by the tenth day. The more

recent attacks have been graver, bringing transient paralysis; the blood pressure is high, and the optic disk congested. Lumbar puncture brings relief.

Sachs, E. Brain Tumors. [Arch. of Surgery, July, 1920.]

Of the eighty-five patients seen by Sachs, twenty-nine died, or 35.5 per cent. Eighteen of these twenty-nine deaths were in patients suffering with glioma, and sixty-four, or a little more than 74 per cent., of the patients had tumors other than glioma, and the mortality in these cases was only 17 per cent. Sachs urges that every brain tumor should be treated on the theory that it may be a glioma, and should be grouped with the most urgent cases that need hospital treatment. Of the gliomas in his series, 26 per cent. were readily removable, though successful extirpations constituted only 14 per cent.

Salomonson, J. K. A. Wertheim. A Brain Tumor Successfully Removed. [Nederlandsch Tijdschr. voor Geneeskunde, 1920, LXIV, H 2, 2619.]

Salomonson rports to the Amsterdam Neurological Society a case of brain tumor successfully removed in a man aged 58. He had a numb feeling on the back of his left forearm and hand, followed by tingling sensations; at first this occurred in attacks of about three minutes' duration. Four months later, in an attack of this kind, he had a series of peculiar spasms and shock-movements in the fingers, lasting for three or four minutes, after which the fingers were quite powerless. Later, the attacks spread to the flexor muscles of the forearms. On the ulnar side of the hand tactile sensitivity was slightly affected, and there was almost complete astereognosis, which began definitely in the ulnar half of the hand and later involved the whole hand. There was a very slight but definite hyperemia of the right optic papilla. The diagnosis was a tumor of the precentral and postcentral gyri on the right side, involving the hand center. The tumor was successfully removed. Mention is made of a second similar tumor recorded by Salomonson in 1918. In the present case the tumor was probably a benignant endothelioma of the pia. Probably in both cases the tumor originated in the postcentral gyrus, for astereognosis appeared early and was followed by Jacksonian attacks. In both cases localization power and discrimination were a little diminished. [Leonard J. Kidd, London, England.]

Tunzen, Ezra. Differentiation of Nephrosis (Brain Tumor). [Jahrb. f. Kinderheilkund, 91, 1920, 51.]

The author describes one of those rare cases of genuine chronic nephritis in childhood which shows at the same time the symptoms of brain tumor. A final judgment is not to be found, the results of a post-

mortem examination being missed. But the difficulties of differentiation are weighed. A healthy boy of six is suddenly taken ill, suffering with a nephrosis for 2¼ years with intervals of two to eighteen months. The attacks of the disease manifest themselves in form of ascites, hydrothorax, anasarka, reduction of urine containing cylinders and albumin till 20 per cent. Whereas digitalis proves ineffective, spontaneously improvements set in, one time after a spinal punction, which had the result of an increase of the spinal pressure to 480 mm., but none of the liquor itself. Other cerebral symptoms are: Stanungspapille in both eyes, transitory paresis of nerve six, nystagmus, retardation of the pulse, vomits and a suprising sympanilio sound in knocking at the cranium (brins de pot fêlé). The spinal punction has no effect on those symptoms. In the last three months several functions of the ascites prove necessary. Neither headache nor convulsions. The boy endured with an active mind, succumbs within four days to influenza.

The excretion of N being undisturbed, no real uremia complicates the chronic nephrosis, especially with young people, but the eclamptic form, the symptoms of which having a striking resemblance with those of a quickly growing neoplasm of the cranium, in most cases in consequence of the edema of the cerebrum in highly dropsical persons. But neither stanungspapille nor the tympany of the skull which first made the suspicion of tumor cerebri rise, belong to those symptoms.

No local symptoms of tumor being found, only those of general pressure in cerebrum, it is the question whether they only depend upon the nephrosis, whether the nephrosis has produced anatomical changes in the cerebrum or whether a tumor cerebri is coexisting with the venal malady. In a number of cases the coincidence of both is described and therefore the suspicion of a causal relationship is not to be rejected at all, especially as the etiology of the chronic nephrosis not being clear, all possibilities must be consideered. [Author's abstract.]

May, W. Page. Mycrogyria and its Effects on Other Parts of the Central Nervous System. [Brain, May, 1920.]

A case of microgyria or arrested development of the nervous system is summarized as follows: Vascular lesion of the right cerebral hemisphere involving chiefly the right centroparietal region of the cortex, with portions of the frontal and temporal lobes and portions of the right basal ganglia. Atrophy and arrested development of the right pyramidal tract, right mesial fillet and associated structures in the midbrain, pons, medulla and spinal cord. Atrophy of the opposite (left) side of the cerebellum with some of its various nuclei and peduncles. Atrophy of the left side of the spinal white and gray matter. Diminution in number of motor cells, chiefly in the cervical and lumbar enlargements. Since earliest life the patient had suffered from left hemiplegia and was mentally deficient. Unilateral and epileptiform convulsions of the ordinary

type were associated with the increasing deficiency. Sight and hearing were normal. The progression of the above symptoms terminated in the patient's death at the age of thirty-six years. Hemiatrophies of the brain are probably due originally to a vascular lesion either arterial or venous, occurring in fetal or early life. The chief organic changes result from arrested development of certain parts of the central nervous system. Cases of mycrogyria may be grouped according to Mott and Tredgold into cortical and basal classes, depending upon the situation of the lesion. The case described shows striking proof of the fact that the right half of the brain is structurally and functionally associated with the left half of the cerebellum and with both sides of the spinal cord, but chiefly the left. [Stragnell.]

Cadwalader, W. B. Significance of Facial Pain in Determining the Location of Intracranial Tumor. [Am. Arch. Neur. and Pysch., August, 1920.]

Pain and anesthesia of the face preceding the onset of deafness are symptoms usually caused by a tumor involving the gasserian ganglion. Neoplasms of the gasserian ganglion invariably give rise to pain or cause objective disturbances of sensation. Disturbances of hearing arise early in cases of tumor of the cerebellopontine angle. The exact order in which symptoms arise is of importance. A particular type of intracranial tumor which involves the cranial nerves, but does not infiltrate the brain substance, is known which gives rise to symptoms resembling those of true fibromatous tumors, but unlike these tumors, pain in the face is a constant symptom. [Stragnell.]

Muskens, L. J. J. The Uncrossed Pyramidal Path. [Nederlandsch Tijdschr. voor Geneeskunde, 1919, LXIII, H 2, 1139.]

Muskens showed to the Amsterdam Physico-Medico-Chirurgical Society a young man who had been operated on six weeks previously for right-sided spasms and convulsive attacks some years after a wound of the right Rolandic region of the skull; there was here a long scar involving only the skin, and the patient had continuous pain on this side of the head under the scar. Muskens explained why he excluded reflex epilepsy. On account of the continuous pain under the scar he decided to explore the right Rolandic region. A local leptomeningitis was found with milky discoloration and thickening of the arachnoid. Unipolar Faradic stimulation of a zone there, of the size of a florin, provoked homolateral facial spasms and then a general convulsion. After the usual local treatment the local pain disappeared for good and some days after the operation there were merely slight epileptic manifestations. Muskens concluded that we may provisionally assume that in the numerous recorded cases of homolateral cerebral palsies an uncrossed pyramidal path was present. [Leonard J. Kidd, London, England.]

van Valkenburg, C. T. A Temporal Lobe Abscess. [Nederlandsch Tijdschr. voor Geneeskunde, 1919, LXIII, H 2, 1115.]

A case of abscess of the temporal lobe was demonstrated by van Valkenburg before the Amsterdam Neurological Society. The patient became somnolent a few days after operation for a purulent parotitis; there was also an incomplete left hemiplegia with (probably) a slight difficulty in findings words. An abscess of the temporal lobe was diagnosed and operation was performed over the mastoid. Punctures with a fine trocar failed to bring away any pus, however. Death after three days from influenza-pneumonia. Necropsy showed osteomyelitis of the fore most part of the petrous bone and also extremely tenacious pus scattered in small cavities in the temporal lobe and the nucleus lentiformis. Doubtless the great viscidity of the pus accounted for the failure to evacuate any, even although the punctures were made over the site of the abscess. [Leonard J. Kidd, London, England.]

Stenvers, H. W. A Postural Reflex of the Human Pelvis. [Arch. Néerlandaises de Physiol., 1918, II, 669.]

Stenvers describes a hitherto unrecorded postural reflex of the human pelvis. The patient was a woman; her right vestibular excitability was possibly slightly diminished; no palsies, but general weakness and rather marked hypotonia; hyperesthetic zones on the trunk in areas of Th. 2, 5, 7, 10; no other signs except the pelvic reflex. In the recumbent position she has an abnormal attitude, head turned strongly to left and inclined to left shoulder; trunk strongly curved, with concavity to left. The left leg is turned outwards and is slightly flexed at hip and knee; the right leg is extended and turned a little inwards; the arms remain passive and are slightly flexed. On putting her in a sitting position she sinks always to the left and forwards. When she is lying free on the left side with the head strongly bent and turned to left, she executes a very complicated movement when she is asked to turn over on to the other side; she begins by inclining her head very strongly backwards so that the occiput is buried in the pillows; then she turns the pelvis to the right and immediately the head turns to the right with an abrupt jerk, after which the shoulders follow. When the pelvis is immobilized she cannot turn her head to the left. On attempting to turn back to her left side, her pelvis being left free, she begins afresh by turning her pelvis to left, and immediately her head and shoulders follow with a jerk. Thus, the rotation-movement of the body is introduced by the pelvis, the head following this movement abruptly, as by a reflex effect. Rotation of the head can be provoked also by passive rotation of the plevis. One firmly immobilizes her shoulders and asks her to remain absolutely passive. Then, while she is lying half on her side, one changes her pelvis from

one position to the other; immediately her head makes a violent, abrupt movement in the sense that it always maintains its normal position in relation to the pelvis, the sagittal line of the cranium being placed perpendicularly to the line which connects the heads of the femurs, while the occiput is turned towards the back. (The reflex remained constant for four weeks.) When the pelvis is passively rotated, the head being fixed, the eyes deviate strongly in the direction of the pelvic inclination, but without nystagmus. When the pelvis is held in position, the patient lying on her back and her head turned to left, one finds that if her left shoulder be slightly raised her head turns to the right with a jerk, but she inclines more strongly towards the back than when the pelvis is rotated. Stenvers' reflex can be elicited also, but feebly, when the back is not resting on the bed. He draws attention to the resemblance of his reflex to that described by Magnus in the rabbit whose brain has been removed proximally of the thalamus, the labyrinths being left intact. [Leonard J. Kidd, London, England.]

Gordon, Alfred. Abscess of the Occipital Lobe. [Phil. Neur. Soc., Feb. 25, 1921.]

E. T., male, aged 36, born in Italy, a veteran of the last war, was wounded during the war in the right arm and stabbed in the left hypochondriac region posteriorly. He recovered from those wounds. In October, 1920, patient developed severe headache over the temporofrontal region on both sides. At first the headache was intermittent, but of late became persistent and unusually severe. The pain soon extended to the left auricular region. During the last two months he has had very frequent attacks of dizziness followed by fainting spells which occurred two or three times a day. He has had also frequent attacks of vomiting, especially in the morning.

An objective examination reveals the following condition. There is not a very pronounced but distinct weakness on the right side. He performs movements with his right arm and leg, more sluggishly than with the left extremities. The knee jerk, flexor and extensor reflexes of the right arm are somewhat more marked on the right than on the left side. There is no ankle clonus, no Babinski on either side but there is a distinct and easily obtainable paradoxical reflex on the right side. When the left side is tested for the latter reflex, a contralateral extension of the right great toe is evident. The absence of the Babinski and the presence of the paradoxical sign have been manifest from the beginning of his malady, before as well as after the operation. The abdominal and cremasteric reflexes on the right are exceedingly slight and sometimes not at all obtainable on the right side, while they are distinct on the left side. The patient's gait is uncertain, there is a certain amount of asynergia as the trunk did not altogether follow the legs; the patient

did not hold himself erect in walking. He swayed somewhat from side to side. He was unable to stand on either foot. Adiadokokinesia was not present. There was no ataxia in the finger-to-nose movement or in the past-pointing test. There was only a sluggishness in the movements of the right arm as mentioned above. Test for sensations revealed the presence of all forms but they were somewhat increased in the right arm and leg, particularly with regard to pain. The deep sensibilities were all intact. Asclereognosis was not present in the right hand or foot.

The eye examination showed slightly unequal pupils, right 4 mm., left 3 mm. The eye grounds were normal. There was a distinct right lateral homonymous hemianopsia. The latter existed from the onset of the disease.

Examination of the blood and spinal fluid was negative.

Urinalysis was negative with the exception of occasional traces of albumin and hyalin casts.

Blood examination showed fl. 75 per cent., red bells 3,190,000, white cells 17,000, blood urea .025, blood urea nitrogen .011.

A Bárány test gave variable and consequently no definite data to form an opinion as to the localization of the lesion.

The patient presented no previous special medical history with the exception of the above mentioned injury during the war. He is married, has two children; the wife had no miscarriages.

Comment.—To sum up, the patient presents a very mild hemiparesis on the right side with hyperalgesia on the same side, also right lateral homonymous hemianopsia. That the paresis was of organic nature is evident from the presence of an increased knee jerk and persistent paradoxical reflex on the same nature is evident from the presence of an increased knee jerk and persistent paradoxical reflex on the same side in spite of a persistent absence of Babinski's sign. These facts and particularly the hemianopsia led the writer to conclude that the lesion was probably in the left hemisphere and in its optic radiations. The lesion produced pressure or irritation forward on the posterior limb of the internal capsule, irritating the sensory and motor portions of it, thus producing the hyperalgesia and the weakness on the right side, also the paradoxical reflex with a somewhat increased patellar tendon reflex.

In view of the history of headache of an unusual severity, also of dizziness and vomiting, the presumption was in favor of a neoplasm in the above area. An operation by Dr. Behrend over the occipital region exposing the posterior portion of both occipital lobes revealed an abscess in the left occipital lobe involving the entire lobe. The case is interesting from the following standpoints:

The presence of hemianopsia which more than anything else led to a correct localization of the lesion.

The persistence of the paradoxical reflex at the persistent exclusion of the Babinski sign.

The association of the paradoxical reflex with an increased knee jerk and a paresis on the right side.

The presence of hemihyperalgesia showing irritation of the "carrefour sensitif" of Charcot.

The right-sided symptoms were rather of an irritative than of a destructive character. In the latter case the result would have been complete hemiplegia with hemianesthesia and a distinct Babinski reflex. The few cerebellar manifestations, such as the asynergia, the oscillatione of the body from side to side while walking can be explained by the pressure exercised upon the cerebellum from the above situated abscess.

A lesion, therefore, of the occipital lobe may simulate a cerebellar disease, thus making the localizing diagnosis difficult. [Author's abstract.]

Casamajor, L. THE DIAGNOSIS OF BRAIN ABSCESS. [The Laryngoscope, 1920, XXX, July, p. 436.]

The difficult subject of the diagnosis of otic brain abscesses is here lucidly discussed. Its difficulty depends on the common inability of the patient to cooperate, the severity of the disease and its usually short course. Temporosphenoidal and cerebellar abscess preponderate greatly over other forms. Otogenic brain abscess has three fairly definite stages: (1) the initial or invasion. (2) the latent, and (3) the stage of manifestations. The initial stage varies in duration and may be lacking; when it is present, there are commonly cerebral signs; fever may be present or absent; the commonest cerebral symptoms are headache. vomiting and clouded consciousness; the headache is usually general, but may be on the side of the lesion; vomiting occurs more in cerebellar than in cerebral abscesses; mental clouding may vary from slight confusion up to severe stupor or delirium; signs of meningeal irritation may be present. This stage lasts usually for twelve to twenty hours, but may last a week. The lateral stage is very variable, may even be absent or may last for days, weeks or over a year. The symptoms of the preceding stage more or less disappear and recovery from the cerebral irritation appears to have set in, but the abscess is now forming as a localized lesion, and with its growth symptoms of the third stage may appear slowly or with startling suddenness. In the stage of manifestations there are usually general symptoms, due to the disease and brain pressure from the abscess and surrounding edema; and local symptoms, due to destruction of and pressure on structures close to the abscess. Among general symptoms fever is often absent and the temperature may be subnormal throughout; there may be an evening high temperature with chills. If the abscess bursts into the meninges or the ventricles, continued high fever is the rule. Headache is constant, may be on the side

of the lesion, is seldom over the site of the abscess, may be hemicranial, and may in cerebellar abscess be frontal. The position of the headache, even when the skull in the region of the abscess is tender on percussion, is unreliable for localization. Projectile vomiting is seen especially in cerebellar abscess. Slowing of pulse, even with moderate fever, is a frequent and valuable diagnostic sign; so is slowed respiration. The pupils are of no value in diagnosis. Choked discs occur in only a minority of cases. Okada says optic neuritis without papilledema is much commoner than choked discs. Convulsions, general, hemi, or local, occur with many large abscesses. Consciousness is always disturbed, from slight drowsiness and confusion to coma and delirium; this prevents cooperation on the patient's part and so adds to the difficulty of examination. The local symptoms are often meager and may be absent. Temporosphenoidal abscess, the commonest of all brain abscesses, has the least definitely localizable signs, especially if right-sided. A large right abscess may give left homonymous hemianopia, but the mental state of the patient may prevent its discovery. In left temporosphenoidal abscess speech disturbances, chiefly paraphasia, are present, with difficulty in understanding of speech; this adds to the difficulty of diagnosis. In cerebellar abscess localized signs are usually definite; the patient lies with head turned back or to the side of the lesion; often there is neck-stiffness; on sitting up the patient has increased headache and often he is dizzy. In standing he takes a broad base; gait is unsteady and asynergic; he may fall to either side. The hands, when elevated, cannot be kept up, but drop suddenly, the one on the side of the lesion oscillating must as it falls. Nystagmus, when present, is towards the side of the lesion. The tendon jerks are usually diminished or lost. Babinski's sign is rarely present. All movements of the homolateral limb, when the patient is reclining, are asynergic. The patient past-points usually towards the diseased side. With the asynergia, adiadokocinesis is usually present. Early diagnosis of brain abscess is essential for good surgical results. Our great difficulty is to localize the abscess. [Leonard J. Kidd, London, England.]

Hoffmann, Hermann. Brain Tumor in Two Brothers. A Contribution to the Heredity of Tumors. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. 51, p. 113.]

The author describes the cases of two brothers in whom tumors situated in the same organs produced similar symptoms. One of the cases was personally observed and the case history of the other was accessible to the author. The essentials of the cases were that two brothers, one three years older than the other, the elder at the age of 33 years and the younger at the age of 48 developed symptoms of brain pressure. In both cases diagnosis of tumor was made, and the autopsy revealed in

each a glioma rich in cells which, in the one brother took in the left gyrus hippocampi and occipito-temporalis and reached up to half of the temporal lobe; and, in the other, was limited to the right hippocampus and gyrus hippocampi. The family history showed that the father in the later years of his life had suffered from epileptic seizures which had finally resulted in death. When collateral members of the same family develop similar diseases heredity may be assumed with great show of probability, and all such cases of tumor go to confirm the view first advanced by Thiersch and Cohnheim that the factor of heredity in the etiology of tumors is of great significance. In the author's cases the only positive indication of heredity consists in the great similarity between the father and the two sons; the fact that the disease was limited to the male members of the family was also noteworthy. The main interest attaching to this case is that it is a contribution to the material on the heredity of tumors. [J.]

Souques, A. Cranial Traumatism and Tuberculoma of the Brain. [Revue Neurologique, January, 1920. Soc. N. et P., January 8, 1920.]

A history of trauma to the parietal region followed by headache was later followed by sypmtoms of increased intracranial pressure, Jacksonian epileptic attacks, etc. Autopsy showed a tuberculoma in the brain beneath the part of the skull struck. [Camp.]

Duofur, H., and Semelaigne, G. The Nature of the Cellular Elements in the Cerebrospinal Fluid in a Sarcoma of the Brain. [Revue Neurologique, January, 1920. Soc. de N. de P. Seance, January 8, 1920.]

The presence of peculiar cells in the cerebrospinal fluid of cases of tumor of the brain first recorded by Dufour in 1904 has been noticed by many observers, Leri and Catola, Sicard and Gy and others. They are large round cells difficult to identify histologically. In some cases they have appeared to be identical to those subsequently found to compose the tumor. In the case reported the patient, aged 22, had generalied convulsions, headache, somnolence and right sided facial palsy. There was a left sided ankle clonus and a horizontal nystagmus. Hearing was defective on the right side on account of otitis media. Ophthalmoscopic examination showed some edema of the upper and external portions of the nerve head in the right eye. The spinal fluid was yellowish, contained an excess of fibrin and globulin and numerous red blood cells, leucocytes, some leymphacytes and some large round cells with a deeply stained nucleus and pale protoplasm which was frequently granular or vacuolated. Autopsy showed a tumor the size of an orange in the parieto-occipital region growing from the meninges. The tumor was

firm and circumscribed and was microscopically a spindle cell sarcoma. The cells in the spinal fluid were totally different from the spindle cells in the tumor. [Camp.]

Winkler, Junius E. The Histogenesis of Glioma Cerebri and the Difference in Structure between Glioma Tissue and Reactive Neuroglia. [Psychiat. en Neurolog. Bladen, 1920, Nos. 3–4, May–August, p. 196 (25 figs.).]

The writer's first case, a neuroglioma cerebri, showed a tissue composed of small oval cells, directed more or less parallel to one another, and for the most part without evident protoplasmic processes. They lie in an interstitial substance formed of a wide-meshed network of fine glia fibers sparingly interrupted here and there by blood vessels. Cavities, whether or not lined by epithelium, occur only in the immediate neighborhood of the ventricles. The normal protoplasmic syncytium has disappeared, and such medullary sheaths as are found are swollen and the vessls have a wide lumen and thin walls. Doubtless we have here a true neuroglioma, belonging to the category of glioma durum on account of its little tendency to softening, lack of hemorrhages and its strongly developed stroma. Its circum-ventricular site shows that it belongs to the central gliomas. In this case there were no large cavities; only immediately around the ventricle of the occipital cornu, where there was no tumor tissue present, were there many small cavities lined with ependymal cells; one of these contained numerous invaginations of the ventricular wall, lined with ventricle epithelium, so that the writer cannot but regard the small cavities as transversely cut ventricular invaginations. On following the ependyma forwards to the frontal lobe where the tumor has its greatest extension, one finds everywhere these ependymal invaginations, with a many-layered ependyma and multinucleated ependymal cells. It is possible to regard these foldings of the ventricular wall as a developmental anomaly. The frequent occurrence of places where the ependyma has five or six layers, the numerous groups of ependymal cells, the occurrence of many invaginations in the surrounding tissue, and finally the multi-nucleated ependymal cells, all this points rather to a proliferative process. That this proliferation cannot be interpreted as a reaction of the surrounding tumor tissue is shown by the fact that in proportion as the tumor decreases the ependymal proliferation increases, and that the latter is at its maximum in the occipital region where no tumor tissue is present. A section around the ventricle at the hinder border of the tumor shows how the ependymal cells, released from their normal relation, arrange themselves in many layers, and how by their more oblong nucleus and their possession of fibrous protoplasm they appear to pass over into glia cells. The presence of these transitional cells and the fact that the ependymal proliferation is greatest where no glioma tissue is formed, renders it probable that these

ependymal changes must have the meaning of a primary proliferation which directly precedes the formation of the gliomatous tissue, and not of a developmental anomaly. The tumor is, then, a gliomatous neuro-epithelioma, and it should have a place in the series of tumors between, on the one side, the true ependymal tumors which grow out of the ventricular cavities and contain cells of more or less ependymal shape, and on the other side the true gliomata.

In the case of a child, which was diagnosed as glioma cerebri, Cajal's glia method was used with the result that a preponderance of large glia cells with numerous processes was found. Further histological examination showed that there were many perivascular infiltrates, a multitude of anatomical glia cells and groups of Gram positive bacteria, so that an encephalitis was established. (A similar condition is figures of the end-stage of an experimentally produced encephalitis in a cat). As to the distinctions in structure between the glioma cell and the reactive glia cell, the writer points out that the former lacks certain qualities that are exactly characteristic of the latter. The reactive glia cell has a polygonal shape, with a great development of protoplasm and a relatively small nucleus that is almost always ex-centric; further, it has generally definite protoplasmic processes which develop in a certain direction, dependent on the situation of the cell with regard to the focus or the blood vessel causing the reaction; the majority of the largest processes are directed towards the focus. In a further stage the fibrils develop out of the protoplasm, not regularly around the nucleus, but locally on the cell periphery, at first separated as far as possible from the centric nucleus. This homogeneous protoplasm then becomes reticular, or one sees a network of fine fibers which send in protoplasmic processes, parallel to one another and form a fiber bundle. (A couple of cells are figured, showing a fibrillogenous zone.) The glioma cell, on the contrary, has a relatively large nucleus or many nuclei, and a regular, nonangular, rounded shape, which is brought about by the uniform development of its protoplasm around the nucleus; and there appear to be no stimuli from the surrounding tissue which could influence this development. At most one sees around necrotic areas in the tumor that this shape is modified and that the glioma cells which surround the focus have directed their greatest protoplasmic development towards it. There is also a difference in fiber-course between reactive glia tissue and glioma tissue; in the reactive glia cell the fibers are formed from one or more peripherally situated zones; the fibers near the focus retain this relation with their cell for a long time. If the reaction of the glia cell be limited to small foci, one sees that the fibers mainly converge towards the focus, the glia cell reacts to an extensive process, such as an encephalitis, and then the fibers run out of the cell in all directions. The writer explains the polygonal shape of these cells as due to an irregular stimulation of the surface of the cell by the presumable external chem-

ical agent, the fibrillogynous zone of the cell being at each angle (this is figured).

The course of the fibers in glioma tissue is quite different: first, the protoplasm of single cells, or the protoplasmic syncytium that contains many nuclei, takes on a fibrillar structure, which is uniformly distributed over the protoplasm, as in a pons glioma figured here. At a further stage one sees parallel-running fibers take the place of the protoplasm, as in a cortical glioma figured. For the most part there are no sharp cell boundaries and gradually this stage passes into the following one in which the cells have set themselves free from the fibrous protoplasm and the fibers form a network of smaller or larger meshes. The relations also of the reactive glia cell and of the glioma cell to the blood vessels are different; the former seeks a connection with the neighboring vessel, whereas the latter is not influenced by blood vessels in the development of the plasma and the fibers. At one time the fibers run parallel to the blood vessel, then, running always in bundles, they make an angle with the course of the vessel; in short, the glioma cell lacks all the individuality which the reactive glia cell has in relation to its surroundings. Among the gliomas examined by the writer was one of the thalamus, in which necrotic areas alternated with gliomatous tissue; as to whether the old inflammatory foci were primary and had led to a reaction of the surrounding glia, or whether these necrotic areas existed in the primary gliomatous tissue, he favors the latter opinion on account of his histological investigations just described. He thinks that the histological distinctions described by himself may be of diagnostic value in further cases. [Leonard J. Kidd, London, England.]

Neel, A. V. Brain Tumors. [Ugesk. for Laeger., July 8, 1920.]

The author's five cases of brain tumors are used to maintain the general argument that a previously healthy person does not suddenly develop neurotic syndromes without some real etiological factors, somatic or psychogenic. One of the patients was long treated for nervousness until the blood picture indicated serious changes and a mammary cancer metastasis was uncovered. In two of the patients motor twitchings and spasms had preceded other symptoms of brain tumor by nearly six years. Striking remissions in the clinical course of a brain tumor are liable, he says, and points out that psychogenic factors must always be reckoned with, x ray treatment even showing typical suggestion reactions.

Frazier, C. F. Effects of Radium Emanations on Brain Tumors. [Surg. Gyn. and Obstet., September, 1920.]

In three only of twenty-four patients with brain tumor subjected to radium emanations there seemed to be indisputable evidence that by radium emanations the growth of the tumor has been arrested and in all probability the tumor destroyed. See Report New York Neurological Society, December, 1920, this Journal.

7. EPILEPSY.

Bambarén, Carlos A. Present Ideas Concerning the Etiopathogenesis and Treatment of the So-called Essential Epilepsies. [Anales de la Facultad de Medicina de Lima, 1920, Vol. 3, January–February, p. 14; March–April, p. 118, and May–June, p. 221.]

Epilepsy is not a single morbid entity as was formerly supposed. The division of types begun by Bravais and Jackson has been continued and a better understanding of the causes of the convulsive seizures has shown "essential epilepsy" to be a mere symptom. There is no longer an epilepsy; there are epilepsias. Numerous etiopathogenic causes as syphilis, alcoholism, infections, traumatisms, etc., give rise to meningoencephalic processes resulting in anatomopathological lesions. These play an important rôle in producing epilepsy, which for this reason is not "essential," but cerebral. With these cases of cerebral epilepsy must be contrasted those due to endocrinopathies, which alone in any way merit the epithet essential and the only provisionally, so long as the anatomopathological factor responsible for them remains undiscovered. In this type of epilepsy the disturbances apparently stand in some relation with chemical anomalies in the organism. Those endocrinopathic convulsions with cranioencephalic disturbances, usually of the pituitary gland, are symptomatic cerebral epilepsies. The predominance of thyroid and parathyroid disturbances in noncerebral epilepsies and the good results which follow opotherapy is very significant. Following these views the various epilepsies may be classified as: (*A*) convulsive, and (*B*) nonconvulsive, *i.e.*, those with equivalents and other forms which fall under this concept. The convulsive epilepsies may be divided into: (1) cerebral epilepsies, in turn subdivided into localized types (of Bravais-Jacksonian character), and general types (infectious, toxic, traumatic, teratopathic and neoplastic). (2) Endocrinogenic epilepsies, or those provisionally considered essential, in turn subdivided into those due to primary thyroid and parathyroid abnormalities and those due to secondary disturbances of these glands, or the pluriglandular syndromes. The marginal gliosis found in the cerebrum is not to be regarded as an idiopathic anatomopathological lesion, but as due to proliferations of the glia following histolysis of the cerebral produced during the convulsive crisis. The original seat of the convulsive manifestations is the cerebral cortex, conclusively demonstrated by the Abderhalden reaction. In the mechanism of epileptic seizures physicochemical phenomena of colloidal nature intervene, in virtue of which toxic albuminoid products are formed which inhibit certain cerebral cellular activities and permit inferior mechanisms of kinetic character to enter into activity. The therapeutics of epilepsy should be individual and should be directed both against the cause of the disease and the symptoms. In each case the causal factor may be different and the symptoms are very diverse. Specifics should be used against the morbid agent, opotherapy against the

functional disturbances, together with nonspecific antigen therapy. The symptomatic treatment with bromide according to the method of Richet and Toulouse has proved very beneficial.

Alikhan. Hereditary Anosmia and Epilepsy. [Rev. de Laryngol., d'Otol., et de Rhinol., 1920, June 15, 330.]

In a family of thirty members there were eleven anosmatics, four hyposmatics and two epileptics; the transmission was by females, themselves anosmatic. The writer made olfactory tests on eighteen epileptics; in all there was either a great diminution or loss of olfactory perception to stimuli from rose, asafetida and alcoholic extracts; to acids and alkalies all the patients, save the dements, reacted, but they experienced only an irritative sensation. Alikhan concludes that hyposmia or anosmia occurs in epileptics, not merely after the attacks, as Féré held, but also during the intervals. He refers to the fact that sclerosis of the cornu ammonis, an olfactory center, has very often been found in epileptics. He does not think that the hyposmia of epileptics is a manifestation of dementia, for in a series of cases of general paralysis and of dementia praecox he found normal olfactory power in most of them. [Leonard J. Kidd, London, England.]

Marsh, C. A. A Psychological Theory of the Cause of Epilepsy. [American Journal of the Medical Sciences, March, 1920.]

The author concludes that we must look upon epilepsy as an abnormal muscular reaction to strong emotional states. It is an abnormal expression because such muscular activity does not gain the end for which the emotional state was generated. It is unnatural since its effort is undirected. The epileptic, because of his peculiar makeup, cannot avoid the dangers of too great stress as the normal man meets it, but, by an emotional drive that cannot be readily checked, labors on to mental exhaustion in unconsciousness. This is not deep enough to involve the motor or life centers of the brain, so a convulsion takes place. Viewing epilepsy in this light, the author thinks that we are now able to institute more rational methods of treatment than have been found in surgical procedure and in empirical therapy.

Wallon, Henri. Emotion and Epilepsy. (Société de psychologie. Meeting of January 29, 1920.) [Journal de Psychologie, 1920, April 15, Vol. 17, p. 307.]

Epilepsy has not long been counted among those diseases which are supposed to exist without perceptible organic lesions. Formerly patients and those about them had often attributed the outbreak of the seizures to emotional incidents but little credit was given by physicians to these histories. Experiences in the war, however, have furnished objective confirmation of the origination of the disease in emotional shocks, though

as Léri notes the emotional origin is now likely to be denied by the patients. Nearly all those who, without having been wounded, have suffered war injuries claim to have been "shocked," because it seems more creditable to have succumbed to the brutal force of war engines than to mere emotions, but numerous instances seem to prove that in the absence of shell explosions near the patient these ictuses can only be due to fear or epilepsy. In citing cases the author observes that usually epilepsy activated by emotion occurs only in individuals who present signs indicating predisposition to paroxysms convulsive seizures. In one of the cases cited by the author emotion led to unconscious states resembling phases of epileptic seizures but also with similarity to those emotional stuporous crises which were frequently encountered in war experiences. Passages from these emotional reactions to epilepsy does not seem impossible. The participation of organic functions are more manifest in emotions than in any other psychic state. Long continued or violent emotions are followed by disturbances which M. G. Dumas has shown are caused by intoxication. According to F. W. Mott the attitudes and reactions accompanying each emotion are due to a discharge of endocrine products into the organism, and Pieron has insisted on the hyperthyroidism and hyperrenalism in emotional states. Epileptic manifestations also, by their form and course, suggest a toxic origin. If the granulations with which Nageotte has shown the neuroglic filaments may be charged are indication of innersecretory activity, the hypertrophy of the neuroglia in the brain of epileptics might indicate a relation between epilepsy and the endocrine functions. The intensity of the circulatory disturbances in the emotions and in epilepsy also suggest a mechanism by which the one might degenerate into the other. Further every emotion of any degree of liveliness or duration is quickly translated into motor reactions, which are only retarded by efforts of inhibition. For this reason Pieron asks if they do not indicate essentially disturbances of association of the nature studied by Lapicque under the name of chroniaxia. The spasmodic phenomena and especially the asynergias expressed in trembling, giving way of the limbs, stammering, aphony, incontinence of urine and convulsions are a series of transitions which suggest the possible transformation of anemotional crisis into an epileptoid seizure. The type of person predisposed to attacks of this nature would be those inclined to spasms and motor incoordinations, or to circulatory instability and excitability of reflexes which go to make up the emotional character—all peculiarities depending quite as much on the trophic condition and developement of the organs as on the constitution of the psyche. It is because of the violent organic reactions in emotions that their influence in the production of epilepsy seems possible. [J.]

Bratz. The Hippocampus Major in Epileptics, Paralytics, Senile Dementias and Other Sufferers from Mental Disease. [Monatsschrift für Psychiatrie und Neurologie, January, 1920.]

The writer studies the occurrences of involvements of the hippocampus major in various forms of mental disease. Sclerosis of the hippocampus major is diagnostic for epilepsy, as well as for idiocy combined with epilepsy, and also for progressive paralysis. It never occurs in schizophrenics in whom attacks of dizziness and convulsions are observed, nor in acute febrile and exhaustion psychoses. [Stragnell.]

Redlich, Emil. Epilepsy after Gunshot Wounds of the Skull. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. 48, p. 8.]

The results of the careful clinical observations of 57 patients with epileptic attacks after skull wounds is discussed and the author endeavors to draw conclusions therefrom concerning the pathology and pathogenesis of epileptic attacks. In cases after wounds, much more frequently than in ordinary epilepsy, the specific causes of the seizures can be determined. Thermic stimulation was repeatedly tested and it was found that while the warm applications produced unpleasant sensations, in the majority of the cases attacks did not ensue. In one case a seizure was produced by the alternate application of hot and cold to the break in the bone and in this case, contrary to the condition in Trendelenburg's experiments with animals, the resistance of the cicatrice, which is a bad conductor of heat, had to be overcome. The author thinks these facts prove that it is possible for epilepsy to result from sunstroke. In some cases the seizures could be caused by strong sensible stimulation in the paretic member. The Jacksonian type of seizures was the most frequent. Epileptoid conditions and psychic equivalents were not observed. For the most part the attacks began in an extremity—usually one relatively slightly paralyzed, for if a brain center is too severely injured it can no longer be a factor in producing convulsions. In three cases extraparoxysmal twitching and in one "epilepsia continua" was noted. In 50 of the 57 cases neurological effects were in evidence and in 48 cases these disturbances were referable to the mortor cortx. Grave psychoses were not observed, and there were no instances of the "epileptic character." The psychic disturbances—episodic depression, irritability, apathy, disturbances of attention and intellect were, in general, no more marked than in those cases of skull wounds in which there were no epileptic seizures. In contradiction to Poppelreuter and in confirmation of Goldstein the author did not find heightened blood pressure in the majority of cases. Leucocytosis was most frequent in cases with general convulsions and there was no evidence in favor of the significance of the epileptic predisposition, which is claimed by most writers to be very important even in traumatic epilepsy; further he did not observea single case of "reflex epilepsy." Wounds localized in the motor

region were more often followed by epilepsy than those in other regions, the percentage being 63.7. In skull wounds without epilepsy this localization was observed in only 40–45 per cent. of the cases. After injuries of the parietal lobe 91.1 per cent. had Jacksonian type of seizures. Lumbar puncture, which was undertaken in only a few instances because of the unpleasant results (production of attacks), gave no indication of cerebrospinal pressure. No results could be attributed to the presence of splinters in the brain but the malformation of the cicatrice seemed to be a factor in causing attacks, especially in the motor region. In general the pathologico-anatomical character of these cases seemed to differ from those cases of skull wound without epilepsy only in degree, or in the localization of the wound. Or perhaps the difference consisted only in the fact that in the cases observed the attacks made their appearance earlier and it may be that later epilepsy made its appearance also in some of the other cases. The results of surgical intervention was not satisfactory in the author's cases. He never observed the complete disappearance of the seizures, and the covering of the bone defect was, according to his experience, inadvisable. [J.]

Marchand, L. Epilepsy and Hysteria. [Presse méd., September 8, 1920.]

Associated epilepsy and hysteria frequently occurs according to the author who maintains that treatment must be differentiated. He reviews the older literature on this combination.

Buchanan, J. A. Hereditary Factors in Epilepsy. [Minn. Medicine, November, 1920.]

All of the 128 cases of essential epilepsy analyzed by Buchanan had normal or approximately normal blood pressure and negative Wassermann tests, and all had negative sella turcica findings or other cranial evidences of definite significance. The examinations of the eye grounds were negative. Examination of the spinal fluid was made and found to be negative. In none of the cases was a cause for the convulsions found. 10.9 per cent. of the patients had a direct or indirect history of epilepsy in the family. One only had a child that was epileptic. Migraine was present before the onset of epilepsy, and alternated with or continued with epilepsy in eighteen (14 per cent.) of the cases studied.

Masoin, Paul. The Diazo Reaction in Epilepsy. [Bulletin de l'Academie Royal de Médecine de Belgique, July, 1919.]

Masoin has here discussed the diazo reaction of the urine in cases of epilepsy. The diazo reaction was not obtained with average urine. He finds (*a*) the diazo reaction in epileptics is an indication of a general upset, which affects most of the urinary excretions and in particular the

excretion of nitrogen. (*b*) This fact is an argument in favor of the view that certain forms of epilepsy result from a state of autointoxication, a true disturbance of cell metabolism. Absence of a diazo reaction in epilepsy justifies a favorable prognosis; the presence of the reaction implies a fatal prognosis in two thirds of cases. The diazo reaction, which appears on the occasion of epileptic parovysms, is an indication of a disturbance which affects the nutritive exchanges of the subject. In spite of the semeiological insignificance with which this reaction was first viewed, it seems to be a demonstration in the mechanism of cellular metabolism. The view that epileptic crises are the result of intoxication by ammonium carbamate is discussed and it is pointed out that the intoxication with ammonium carbamate is probably excessively slow as compared with the rapidity of onset of an epileptic attack and the rapid evolution of the symptoms.

Jellinek, S. The Diagnosis of Epilepsy. [Wien. med. Woch., November 1 and 8, 1919.]

Two signs of epilepsy—the presence of Babinski's reflex and the occurrence of petechiae and ecchymoses in the skin and mucous membranes are discussed especially by Jellinek. Babinski's reflex is present during the attack, and often this persists for three-quarters of an hour. In many cases after reflex was exhausted Oppenheim's sign could be observed especially after attacks of petit mal. Petechiae, though not found so regularly as Babinski's sign, occurred in nearly half of the 368 epileptics observed by Jellinek. They were most frequently found in the upper lids, but in many cases upper and lower lids were sprinkled over with petechiae. The root of the nose and forehead, and even the frontal scalp and temples had them.

Clark, L. Pierce. A Psychological Interpretation of Essential Epilepsy. [Jr. Am. Med. Sc., May, 1920.]

The causation of essential epilepsy is dependent upon a primary congenital defect or inheritable defective instinct of natural and healthful adaptations to reality; producing the epilepic makeup or constitution. At successive periods in life, early infancy, nursery days, puberty and adolescence, when intensive emotional and psychic stresses are encountered, the potential epileptic has epileptic reactions such as fits, temper outburst, lethargies and various psychic phenomena. The fit is a regression, a flight into unconsciousness from undue stress. The convulsive phenomena resemble somewhat the impulsive movements of the fetus and nursling, and are the deeper manifestations of unconsciousness. The depth of the regression and the infantility of the individual may be studied by analysis of the states of automatism, conscious analysis, and dream states. The proper treatment of epilepsy is not by sedatives but by intensive and persistent educational training, together with the cor-

rection of mental and physical disorders that can be remedied by occupation, educative play and healthful interests.

Van Valkenburg, C. T. The Position of So-called Genuine Epilepsy. [Psychiatrische en Neurologische Bladen, 1915, Nos. 4 and 5.]

Basing his observations on material gathered from a hundred epileptics studied in the clinic, the writer proves that genuine and symptomatic (cerebral) epilepsy present, from a constitutional point of view, absolutely the same features. Lefthandedness, stammering, hemicrany, nocturnal enuresis are equally frequent in both forms, in the patient and his family. Epilepsy and convulsions appear with the same frequency in the relatives of both groups. There is no difference in the results of Abderhalden's reactions. No differentiation can be made between organic and genuine epilepsy. The only certain etiology consists in a cerebral lesion, intrauterine in origin. It is very probable that some difficulties of metabolic (endocrine) nature may determine what is called epileptic predisposition, *i.e.*, the constitutional element of the disease. [Author's abstract.]

Leriche, J. Pathologic Physiology of Jacksonian Epilepsy. [Presse méd., September 15, 1920. J. A. M. A.]

The author observed an attack of Jacksonian epilepsy while he was examining the brain. The sudden spasm of the cerebral arteries, inducing immediate and pronounced anemia of the cortex impressed him greatly. The C. S. F. he found diminished under pressure in the men with Jacksonian epilepsy following a war wound. The humeral artery on the side affected was also dilated in these cases, and its ligation had a favorable influence on the peripheral sensations. These facts suggest that sympathectomy might favorably modify the circulation in the brain in cases of Jacksonian epilepsy. They suggest further the possible advantage of injection of small amounts of artificial serum, about 150 c.c. on alternate days, to maintain the proper pressure in the C. S. F. It is likewise possible that systematic ligation of the humeral artery might aid in warding off the attacks; some of the men found out for themselves that wearing a constricting band around the arm and tightening it when symptoms develop, would often abort the Jacksonian spasm.

Braune. Trional in Epilepsy and Other Nervous Diseases. [Zentralbl. f. inn. Med., June 26, 1920. B. M. J.]

Trional in doses of 0.5 gram twice daily is suitable for the treatment of epilepsy and is at least as valuable as the bromides. The danger of intoxication should not be disregarded, but can be avoided. The drug is contraindicated in patients with debilitating diseases. Regular action of the bowels and proper functioning of the kidneys must be maintained

and opportunities afforded for a long stay in the open air. Baths should be given several times a week and plenty of alkaline water ordered. Temporary interruption of trional treatment is necessary if larger doses than 0.5 gram twice daily are given. Bromides and other drugs can be combined with trional. Braune has found that trional diminishes the number and severity of the fits, shortens or prevents postepileptic stupor, makes the patient more peaceful, and improves the mental condition. Trional is also of value in increased irritability of the brain and nervous system.

Pilcz, Alexander. TRIONAL AND THE TREATMENT OF EPILEPSY. [Therapeutische Halbmonatshefte, 1920, May 15, Vol. 34, No. 10, p. 291.]

Braune calls attention anew to trional which as a remedy in epilepsy had been almost forgotten. The author believes that the reason this drug was abandoned was because of the dangers attaching to its use. He cites various authors who consider it harmful or even dangerous to life. Foreseeing that the good results attained by the new method of administering the drug may tempt physicians to use it, he emphasizes the warning that whenever trional is given for a period of from one to three weeks its use must be discontinued for the same length of time—a precaution which should never be neglected. [J.]

Maillard, Gaston. TREATMENT OF EPILEPSY. LUMINAL. [L'Encéphale, 1920, July 10, Vol. 15, p. 455.]

New treatments of epilepsy are received with skepticism by the profession, and it was with little confidence that the author undertook his experiments with luminal when good results from this drug were reported by M. Raffegeau. The author was greatly surprised by the outcome of its usage, however. The effect upon the seizure itself as well as on the vertigo was decided and immediate. On the day following the administration of the drug the attacks ceased and did not reappear again at all, or only at long intervals. It seemed that the dose of luminal could be diminished to 10 or even 5 centigrammes per day and in these small doses prevent repetition of the attacks. The author gives graphs of 14 cases treated by him. In regard to the effect on the psychic disturbances, two series of phenomena must be considered, namely, the acute psychic disturbances and the chronic. The former seemed to be sometimes provoked at the beginning of the treatment with the drug. It seemed as though where the convulsive attacks were restrained the epilepsy becomes manifest in its psychic form. The author has never observed these acute psychic attacks except in patients who had previously manifested psychic equivalents and here again luminal may be of aid, for the violent agitation may be averted by augmenting the dose for a couple of days when the first signs make their appearance. In the author's cases the psychic disturbances all finally disappeared, as did the

seizures and vertigo, under the influence of the continued treatment. The chronic psychic state is also marvellously influenced by luminal. [J.]

Watkins, H. M. Epilepsy Treated with Luminal. [N. Y. Med. Jl., December 4, 1920. J. A. M. A.]

Watkins states that cures are not to be expected from the use of luminal in epilepsy. It is at best a palliative remedy. It is not virtually a specific. It reduces the total number of convulsions in all classes 66 per cent., although a small proportion of patients have an increased number of convulsions during its use. It has practically no effect on some patients, and about 10 per cent. show untoward symptoms from its use. It has all the bad effects of bromides with the exception of the rash. The drug must be used over a long period of time and continually, as once its administration is discontinued the epileptic habit returns with increased severity.

White, F. W. Appendicostomy and Cecostomy for Intestinal Stasis in Epilepsy. [Am. Jl. Med. Sci., August, 1920.]

This paper deals with the results of appendicostomy or cecostomy with subsequent washing out of the large intestine for a period of six to twenty-six months in two patients with epileptic seizures and two are described as having "neurasthenia." The general theory was the autointoxication theory, but after the (psychogenic) factors had worn off the attacks were as bad as before. The author comes to a negative conclusion regarding the validity of the hypothesis and the value of the procedure, all of which has been abundantly shown over and over again. One neurasthenic patient was improved and one was not. In both epileptic cases the immediate results were fair.

Marie, Crouzon and Bouttier. A Modified Borax Treatment of Epilepsy. [Presse méd., October 9, 1920.]

Experiments with borico-potassic tartrate are here reported upon. This double salt has been termed the "boric emetic," but this term is due to an error, for it possesses not a trace of such properties. In ordinary bromide medication the potassium salt has always been regarded as stronger than the other bromides, suggesting that the potassium component played some active rôle. Borax has had a limited use for many years. Tartaric acid does not seem to figure actively in the molecule but yields a double salt in which both boric acid and potassium are combined. In excessive doses the salt is a purgative. In testing a new remedy for epilepsy the reduction of the number of convulsive or minor seizures in a large number of epileptics is the criterion. The test is also made from the standpoint of the individual subject, since the treatment is apt to vary much with the personal equation. The only claim made by

the authors appears to be that the new salt is more efficacious than any of the older boric preparations and hence may develop some usefulness in bromide-intolerant patients. Further, by acting as a synergist, it may enable one to reduce the usual dose of bromides. In serial attacks and cases of status the authors have succeeded in reducing the number of daily convulsions, while in other cases the number of monthly attacks was cut in two; but the failures offset such results and show that the drug will hardly supplant bromides in the drugging of epileptics.

Codet, H. Luminal in Treatment of Epilepsy. [Progrès Médical, September 28, 1920.]

The dose of luminal, phenol veronal, found most suitable were 0.3 gm. per day for two attacks and then 0.2 gm., returning to the larger dose if the seizures are not modified, and reducing the dose if there is too much sleepiness. The doses must always be fractioned, and this treatment should never be stopped abruptly. Hot baths are useful for excitement, and if the torpor is profound and the pulse weak, heat is a stimulant. The authors figures are on 16 epileptics. The report only indicates that the drug hinders the motor discharge. It does nothing to get at underlying causes.

Labbé, M. Epilepsy and Diabetes. [Paris méd., May 1, 1920. B. M. J.]

The author here confines his attention to epilepsy occurring in the course of diabetes and gives an extremely superficial survey of this intricate problem. Epilepsy occurring in diabetic patients may be of various kinds—for example, there may be a coincidence of the two diseases, or a diabetic may have a fit, due to extrinsic causes, such as alcoholism, or uremia, or cerebral syphilis, tumor, abscess, softening, or meningitis. Four examples of epilepsy occurring in diabetes are given, to show that in cases of acidosis in which uremia and all other causes could be excluded it appeared justifiable to attribute the epilepsy to acidosis. The attacks were observed during the stage of complete coma or in the prelonged loss of consciousness.

Laurès, G., and Gascard, E. Urea in Spinal Fluid in Epilepsy. [Presse Médicale, June 16, 1920. J. A. M. A.]

Six epileptics during epileptic seizures and during intervals, also six men with pronounced hysteria and two hystero-epileptics are here reported upon as regards the urea content of the C. S. F. The figures cited show that a marked rise in the urea content of the cerebrospinal fluid during an epileptic seizure, and a marked drop in the urea content in an attack of hysteria.

Guillain, G. Diabetes and Epileptic Seizures. [Bull. de la Soc. Méd. des Hôp., June 11, 1920. J. A. M. A.]

Guillain reports a case of epileptic seizures developing for the first time in a soldier in the course of abute diabetes. The seizures subsided under treatment of the diabetic acidosis, and with them the left hemimonitory stage; they were localized or generalized, and followed by proplegia which had developed at the same time. In Labbé's four similar cases, the connection between the grave diabetic acidosis and the seizures was equally evident.

Richter, Hugo. Is there a War Epilepsy? [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. 46, p. 131.]

By war experiences light has been thrown on the origination of both epilepsy and hysteria such as could not have been obtained by many years of observation under peace conditions. The author gives the results of his experiences with epilepsy, covering a period of about eight months in the Garrison hospital at Budapest. He observed 450 cases, of which 250 developed epileptic seizures during war experiences. He gives extensive tables setting forth the causes in each case, the type of epilepsy, etc., and arrives at the conclusion that, in a considerable number of cases where there are no considerable congenital stigmata or signs of degeneration epileptic seizures make their appearance following a war trauma (shock) and a permanent condition sets in resembling that observed in "genuine" epilepsy. In this sense the author states, it may be said that there is a war epilepsy, produced immediately and principally by injuries and stresses of war. This view is entirely in conformity with the theory advanced by Redlich concerning the nature of epilepsy. Those who succumb to war epilepsy are individuals in whom the tendency to epileptic reaction—a mechanism existing in every brain—is somewhat more easily set in activity than in persons exposed to the same experiences who do not develop the disease under the same strain, but less easily than in those who develop epilepsy even in the ordinary life of peace times. Even in these latter individuals congenital stigmata and sign of degeneration furnish indication of heightened tendency to epileptic reaction in only about one fourth of the cases. [J.]

III. SYMBOLIC NEUROLOGY.

1. PSYCHOLOGY — NEUROSES — PSYCHONEUROSES.

Thurstone, L. L. Anticipatory Aspect of Consciousness. [Jl. Psychology and Scientific Method, 1919.]

The fundamental thesis of this article is that every normal psychosis (mental state) is the expectation of experience, that it is forward looking and adaptive in function even when the mental state seems to be memorial or retrospective in character. The concept of the reflex cir-

cuit is generally used with the simpler forms of action but we do not apply it as we could do in discussing larger psychological categories, including instincts and emotions. Every mental state can be thought of as the stage in an action. The simpler conative categories constitute a stage which may precipitate immediately into action, whereas the higher thought processes are earlier stages in the history of the act. Thus, a concept can be thought of functionally as an unfinished act which is conscious or explicit at an early stage before it becomes personal. The law of ideo-motor action applies to all of the psychological categories. Thus, a concept is an early stage in an adaptive act which tends to define itself toward overt completion. If it defines itself sufficiently to become personal it is more properly spoken of as an idea. The idea in turn defines itself into a still later stage of the act and finally precipitates into overt action unless inhibited. The article concerns only the categories which may be classified as belonging to the momentary psychosis, using the term psychosis as equivalent to a normal mental state. The same point of view can be extended quite readily to the permanent characteristics of the individual. In that case we have the concept of the reflex circuit, the tendency of this circuit to complete itself and define itself into overt action, as in interpretative principle on which to build our analysis of the permanent categories, such as instinct, the self, character, and motivation. I believe that the point of view here described will enable us to bridge the gap between discussions of the categories of the momentary psychosis in which psychology has primarily been concerned and the more permanent motives for action to which psychiatry has given so much attention. [Author's abstract.]

Clark, L. Pierce. An Experimental Study in Mental Therapeutics. [Medical Record, Feb. 21, 1919.]

The usual forms of occupational and amusement therapy, admirable as these remedies have proven, have only too often been followed in a stereotyped manner and made quite distasteful to the neurotic and psychotic. Our aim has been to seek several new and as yet not fully tried out remedies, and this rather unique therapeutic approach was applied to a heterogeneous group of nervous invalids during a trial period covering several months. The plan of therapy embraced four classes of school work: (1) Montessori and kindergarten classes for pupil patients and pupil teachers, (2) out-of-door craftswork: woodcarving and cabinet making, (3) the teaching of English expression in reading, story-telling and dramatic work, and (4) rhythmic dancing. All the work was undertaken out of doors in groves and forests. The types from which the individuals were taken included psychoneurotics, retarded depressants, epileptics, organic palsies with slight physical and mental retardations, and speech disorders. The work was carried out under the supervision of experts in these four special fields who also possessed

insight into the nature of the mental defects treated and what was essentially needed for each patient.

From the gratifying results obtained from this trial period I am convinced of the lasting value of such therapeutic remedies, and believe that rhythmic dancing, especially outdoors in natural surroundings and modified for men patients, has come to stay, and should be more generally employed. These new principles of mental therapy should be applied not only to mild nervous disorders in private practice but in sanatoria and modern public institutions. Not a little advantage is gained in making them very flexible in application and as an integral part of country life. Properly equipped such an experiment calls out the very best initiative of teachers, nurses and physicians. In our experience there are many values in the novel and bizarre not obtainable in systems and routines haltingly or indifferently applied. So long as we train neurotics for normal life interests and the natural social activities that grow out of them, we cannot go far amiss in mental therapeutics. [Author's abstract.]

Ichok, G. The Tuberculous Psychoneurosis. [Zeit. f. Tuberkulose, February, 1920.]

The author states that while well-marked psychoses following pulmonary tuberculosis are extremely rare, a psychoneurosis is often seen. Three forms of the disease may be distinguished according as it occurs (1) in cases with an hereditary history and in latent and abortive forms of pulmonary disease; (2) in chronic pulmonary tuberculosis; (3) in acute cases. This classification, however, must not be taken too rigidly, as a separation of the different forms is not always possible. Tuberculous intoxication may not play the chief part in all cases, because, on the one hand, the psychoneurotic symptoms do not always increase with the progress of the pulmonary lesion, and, on the other hand, the characteristic picture may be fully developed with very slight lesions, or with merely a disposition to tuberculosis. It is suggested that the chief cause of the psychoneurosis is the consciousness of an organic inferiority.

Amrein. Action of Tuberculosis on the Psyche and Character. [Corr.-Blatt. für Schw. Aerzte, August 28, 1919.]

The author devotes a long study to this subject without reference to the large literature. As a sanitarium phthisiologist he is evidently guided by his own finds but his paper is written with some reference to one on the same subject by Romisch in 1904. The psyche in this connection implies the inner existence and the character the outward expression. Naturally the specialist in a long career sees all kinds from irresponsibles to heroes. The psyche and character of the child victim may be omitted in this connection although when the adult consumptive

has suffered in childhood, tuberculosis as well, the early experiences must powerfully affect the mind in one way or another. Most consumptives are young adults or old adolescents whose characters have not had time for development. Other writers on the subject seem to have assumed tacitly that the victim has reached sufficiently mature years to show some responsibility. In such a case there must be a great conflict between the inclinations and the fate which seems to impend. The beneficent effects of work upon the character may not be realized if the subject is an invalid and under strict treatment. The victims are often young people of unusual talent and promise who are ambitious for themselves or others. Incapacitated for work they must think and speculate. They become introspective and upon the one subject of their disease. They read popular articles about consumption and how to avoid and cure it. A singular fact even on the part of the scholarly is a form of the deterioration of taste. While at first one notes the taste for the classics these are in time replaced by stories of crime and its detection. The decline does not stop here for the next step is to read the frivolous and then to be indifferent to all literature. Even the newspapers pall. In other words the patient suffers from a progressive secondary neurasthenia which goes far to explain his mental make-up. He may even be classed as psychasthenic with his obsessions of using the thermometer at all times and much behavior of the same type. If fairly able to get about he indulges in alcohol and flirtations and his motto seems to be *carpe diem*. Idleness is largely responsible for all moral delinquencies, plus the tendency to make the most of what remains of life. His behavior is not paradoxical but about what it would be under his peculiar circumstances.

Book Reviews

Tilney, Frederick, and Riley, Henry Alsop. The Form and Function of the Central Nervous System. [Paul B. Hoeber, New York.]

This work is subtitled "An Introduction to the Study of Nervous Diseases." There are over a thousand large octavo pages divided into 50 chapters. Such an ambitious work calls for more than passing attention and it deserves it, for it represents the most profound effort at a fundamental presentation of neurology that has appeared as a result of American neurological scholarship.

No more lucid statement of the needs of medicine could be made than that found in the opening chapter on the importance and significance of the central nervous system, not only for students of neurology but for all observers of disease, bodily or social. Every phenomenon of human life is largely regulated by the nervous system. Heretofore students have had too much form and not enough function. Morphology has run ahead of physiology and the study of the nervous system has always been considered too difficult and too intricate to be worth while. The average man could make a living without it, so why bother? His general defence reaction has been to stigmatize the student of neuropsychiatry as "theoretical" and behind his self-complacent egotism conceal an ignorance so abysmal that it would be tragic if it were not so funny.

That the authors here have seen the magnitude and seriousness of the crying need for intelligently trained doctors is evidenced by their considering this highly technical volume as an "introduction." It *is* this, but it is a *thorough* one, not an "introduction" in the Quiz Compend sense that introduces no one to anybody, and only serves the false purpose of passing intellectual bluffs called examinations.

Tilney and Riley first discuss the significance of the somatic nervous mechanisms which regulate the animal in his contact with the environment, and, secondly, the splanchnic or visceral mechanisms which have to do essentially with metabolism. The *effort* and the *essence* of life are their respective functions. The authors then take up the sensory and motor components in both the somatic and visceral systems. These components they trace after first briefly outlining what they do.

All of life's manifestations are built up out of the compounding of the reflexes of these components.

The authors then plunge into a series of embryological considerations. Notwithstanding the usual complexity of embryological descriptions these are singularly clear and are elucidated in an orderly manner. Superfluous material is omitted. Chapter IV deals with

types of nerve cells, neurones; and their integration and chaining together is dealt with in the following chapter. Three chapters on the general morphology of the spinal cord follow, and the histology and cell groupings in the cord, the relative arrangements of white and gray matter considered next. Here for a moment the authors hark back to old conceptions. When they say the control of the muscles [meaning voluntary, we presume] in all their complex activities is vested in the cells of the ventral gray column, we are quite sure they do not mean this literally. "This influence arises within the cell body itself and is independent of all other sources of nerve impulses within the nervous system." In an integrated mechanism can a single effector neuron be thought of as an independent source of energy? If as the authors have already held that the energy comes through receptors, how can it be a special isolated attribute of a cut off somatic neuron at its cell body end? This is the old-fashioned electric battery idea of a motor cell. In an energy system it still is only a transmitter not a manufacturer of energy. A few pages farther on [151] after being told that the motor cell is an independent source of energy, we are told that the "motor-cells receive their impulses not alone from spinal cord dorsal root ganglia, but also from distant organs." Thus they are not independent sources. The concepts idiodynamic, intrasegmental, intersegmental, synergic, automatic associated and voluntary control are excellent and well illustrated. We feel a trifle discontented with the separation of function of white and gray matter. This is not an altogether logical mode of dealing with the dynamic conceptions these authors set out to elucidate. It is perhaps only a question of language, but we do not believe the separation as outlined is valid. Thus in chapter XI when they speak of the functions of the white matter in a cord segment it seems to the reviewer to be distinctly misleading. The white matter of a cord segment is only part of a large connector system, the function strictly speaking is a part of the whole system. It may be disturbed at different points in the system. The place disturbed can be said to have a function by itself only in a very limited and limiting sense. Pathway function may be disturbed at different parts with variable results, the variations in results may localize where the disturbance may be located: Is it good neurology to say that such variations as results are functions of the dislocated parts of the pathway?

The authors distinctly avoid this difficulty when they later trace functional pathways as a whole.

This type of elucidation is singularly well worked out in this volume. And the case history material is well integrated with the study of "functional relationships" of the region affected; we prefer "functional relationships" of areas involved to the "function" of this or that column. Such a concept would avoid an overschematization of cross section pathology which is here somewhat in evidence. Friedreich's ataxia for example. Nevertheless the method of rigid analysis of functional defects is to be highly commended.

Chapter XIII begins the gross morphological study of the brain and its envelopes. The medulla is then taken up in six chapters.

These are excellent, possibly the best in the volume for clearness of description and analysis of this difficult region. The reproduction of the micro-photographs of the histological structures, however, is much below what they should be. Analyses of pontine lesions then follow in two chapters, and cerebellar structures and functions in three. The chapters on the cerebellum are splendid. Three chapters on the mid-brain then follow. The analysis here of possible syndromy is fragmentary. Three chapters on the interbrain are quite full of embryological details and open up a large number of important questions.

The following three hundred pages in fifteen chapters take up the endbrain. Surface anatomy, embryology, coverings, arterial supply, cortical histology, projection and association systems, and nuclei are discussed seriatem. The various clinical syndromes are all too summarily taken up, but few are neglected, save perhaps the numerous cortical syndromies, and the more or less well established vascular accident syndromes. An excellent glossary and a classified bibliography terminate this section.

All in all the volume is one of splendid accomplishment and is a distinct contribution to neurological science. It is one of the most signally valuable products which has appeared from an American university and well merits the laudatory things said of it by Prof. Huntington in his appreciative foreword. It is an index of sound neurological scholarship, and a work of great value to all interested in neurology whether as morphologists or as clinicians. We wish it a well deserved success. JELLIFFE.

Kappers, C. U. Ariëns. DIE VERGLEICHENDE ANATOMIE DES NERVENSYSTEMS DER WIRBELTHIERE UND DES MENCHEN, I ABSCHNITT. [De Erven F. Bohn, Harlem.]

Neurological science has been waiting for a book like this. For the past 50 years students of the structure of the nervous system in all forms of animals have been investigating and recording their findings. Now and then a particular organ of the nervous system, the hypophysis, the cerebellum, the cranial nerve components, the lateral line organ, the frontal lobes, this or that sulcus or fissure, etc., etc., have been passed through the crucible of morphological research and been recorded in larger or smaller monographs of recognized value. But a clear, broad sweeping treatment of the general phyletic organization of the nervous system has been lacking. This is contained in the volumes which have come to us, the first portion of which on the invertebrates we have already mentioned.

The animal body is conceived of in its most general capacity as an energy transmitter. Through the special receptor organs it receives its stimuli that determine its conduct. The pathways by which such stimuli are organized for effector purposes in the steadily advancing phyletic synthesis, which we call the nervous organs, are here most admirably traced. It is done in the best of scientific manners, neither too sketchily, nor yet too ponderously detailed. We believe Kappers has struck a most happy balance between a hasty

generalized impressionism and a ponderous mountain of detailed and precise records which would need a lifetime to master. The essential facts are there at the service of the clinician, and for use by the anatomist.

The first fifty pages discuss the general morphology of nerve elements and in thirty more are outlined the general laws of connection of the neurones, the development of symapses and some fundamental concepts of reaction to stimuli and their consequent structural results. These Kappers has formulated under his law of *neurobiotaxis* an extremely suggestive and valuable generalization in the study of the development of nerve organs, and which becomes an important principle in the interpretation of evolving structures in the nervous system.

The second chapter deals with the comparative anatomy of the spinal cord. Amphioxus, Cyclostomes, Plagiostomes, Ganoids, Teleosts, Amphibia, Reptiles, Birds and Mammals are carefully compared and the successive organizations of the spinal cord, its surroundings and its protections developed. Illustrations are numerous and instructive, and further the concepts bearing upon the organization and progressive developments of the spinal cord.

In a third chapter the branchial system, the nerves of taste, the trigeminus and the components of the medulla are carried through the same animal series. In the fourth a similar discussion of the eighth nerve components, and the lateral line system of lower vertebrates is given.

The effector systems of the medulla and midbrain follow in the fifth chapter, while the sixth and last takes up the coordinating pathway and synaptic junction systems between the medulla and the midbrain. In this chapter the coordinating work of the olives is treated at great length.

Each chapter has an extensive bibliography, so that further details can be pursued by those eager to follow out any special line of investigation.

With this general summary of the contents of this remarkable volume we leave it to our readers. No detailed analysis could serve any useful purpose. The book is a masterpiece not only evidencing the author's large grasp of the many intricate problems but above all it is a delightful exposition. We are enthusiastic about the book above the ordinary and believe that every worker in neuropsychiatric fields who aspires to be well grounded in the structure of the nervous system should acquire it. JELLIFFE.

Hahn, G. v. DAS GESCHLECHTSLEBEN DES MENSCHEN. Johann Ambrosius Barth, Leipzig.

This is a small thesis among the many dealing with problems of sexuality. They have been of all kinds, an index alike of the importance and magnitude of the questions involved, as well as of prurient curiosity. This particular volume is quite similar to the general sex hygiene books which are familiar in all other tongues. It is a very good one and is written for the lay public.

Adler, Alfred. Die andere Seite. Leopold Heidrich, Wien.

A short political polemic of socialistic trend regarding the recent war. It is termed an essay in mass psychology.

Federn, Paul. Zur Psychologie der Revolution. Anzengruber Verlag, Wien.

An interesting psychological interpretation of a fatherless society, as descriptive of the revolution in Austria and Germany and other continental countries, based upon certain aspects of the Freudian psychology. Society has lost its old type of father, the King, and seeks to replace it by a substitute. He very clearly shows how long a process it must be before the state builds for itself a really progressive father substitute. Present-day society being governed so fundamentally on nationalistic ego tendencies, hating all encroachments and murdering its neighbors still on the pattern of the family rivalry so productive in making individual neuroses.

Brown, W. Langdon. The Sympathetic Nervous System in Disease. Oxford University Press, London and New York.

A very valuable short resumé of vegetative nervous pathology—not as complete as Higier's valuable monograph, nor as some recent works in neurology, yet to be read and kept for reference. It contains the fundamental concepts which an advancing neurology must utilize.

de Jong, Herman. Die Hauptgesetze einiger wichtigen körperlichen Ercheinungen beim psychischen Geschehen von Normalen und Geisteskranken. Julius Springer, Berlin.

This doctorate thesis from the Amsterdam faculty is an interesting and important contribution toward the problem of determining values concerning states of tension in the vascular mechanism in healthy and sick individuals, particularly as applied to the problems of psychiatry. The plethysmographic study of vascular variations arising on a basis of emotional states is the chief interest of the paper. Vascular spastic states as observed in catatonics are well illustrated. The whole problem is well brought out, although to the reviewer the general subject of vascular tonus can not be used to solve the particular problems. They are too individual. Individual vascular alterations that accompany action pattern integrations must be valuated, nevertheless de Jong has made a good beginning.

Quercy, Pierre. Étude sur l'Appareil Vestibulaire. Imprimerie Regionale, Toulouse.

The vestibular apparatus is the most constant of the cranial sensory organs of vertebrates. There are blind vertebrates, there are anosmic vertebrates, entire orders are deaf, and the lateral line organ belongs only to certain vertebrates leading an aquatic life. The nerve of space, however, is practically never missing. It is primitive in some and anomalous in a few pathological instances, as the Japanese

dancing mice, but absent never. The author therefore devotes a book of 200 pages to tracing its phylogeny, to describing its mammalian structures and to outlining a few characteristic syndromes due to disease implicating its structures.

This he does in a very acceptable manner and has given us a readable and valuable thesis of this nerve of space, regulator of tonus, of static sensibility, of time relations, and of proprioceptive integrative activities. We believe him incorrect in speaking of its diminishing importance in the advancing animal phylum and to have analyzed very imperfectly the advancing evolution of the cochlea as an integral part of the entire vestibular mechanism. His failure to grasp the gradual development of space regulation through the speech and hearing mechanism—symbol activities in the human being—leaves a lacuna in his work of transcendent importance. The purely sensori-motor functions are well grasped, but the vegetative and symbolic integrations in this important instrument are not at all sensed. Winkler's new study of the eighth nerve in his Manual of Neurology gives us this new note in the evolution of symbolic function which Quercy's work does not attempt.

Tilney, F., and Howe, H. S. EPIDEMIC ENCEPHALITIS. Paul B. Hoeber.

This is a most excellent even if sketchy account of the protean manifestations of epidemic encephalitis. The authors speak of it as a specific entity and divide their case material of twenty cases into nine groups. Short case histories are given with autopsy findings in a few. Discussion of the pathological findings is full and well illustrated, a reprint from the author's article in the Neurological Bulletin. In the concluding chapter the authors regard the disease as a specific one. Fourteen types are recognizable, the cause is as yet unknown. On the whole this little book offers a quick orientation toward an extremely important subject.

Sergent, E., Ribadeau-Dumas, and L. Babonneix. TRAITE DE PATHOLOGIE MENTALE. VIII. PSYCHIATRIE. Tome II. A. Maloine et Fils, Paris.

We have had occasion to refer to the first volume of this section of a recent Traité de Medicine on Psychiatrie. Vol. II consists of eight chapters. Colin and Demay write upon Insane Criminals; Legrain, upon Infectious and Topic Psychoses; Barbé upon Degeneration; Deny on Dementia Praecox; Truelle on Organic and Senile Dementia; Brissot on Aphasia; Bonhomme and Padet on Paresis; Charon on Legal forms of Internement; and Vallon on Jurisprudence.

We can only reiterate what has been said in the discussion of the first volume. We find nothing new—nothing illuminating. Barbé's chapter on Degeneration, which is the largest, repeats the fruitless French generalization of Degeneration which means practically nothing save an evasion of careful clinical study. In it everything

is thrown which meets with disapproval of a purely absolutistic idealism of what should be called normal. It contains much interesting material, but thrown together in a huge grab bag of idiocy, imbecility, mental debility, episodic syndromes and polymorphous delirious manifestations.

Deny's chapter on Dementia Praecox is a sincere attempt at a description of this vast syndromy but it offers no real advance on conceptions already well known and here quite superficially appraised.

The medicolegal chapters, pertaining as they do to French jurisprudence, contain no pertinent material for English readers.

Oertel, Horst. GENERAL PATHOLOGY. Paul Hoeber, New York. $5.00.

To the neurologist general principles of pathology should be of transcendent importance. The neurologist, with wide open eyes, views pathology as a dynamic process, correlated by the activities of the vegetative nervous system. Regretfully no such attitude of mind is found in this volume. It is therefore of value to the neurologist only in a secondary sense. It throws no particular light on his problems, excellent though it be for students of the narrower realms of pathological processes from a purely descriptive standpoint.

Clarke, R. H., and Henderson, E. E. INVESTIGATION OF THE CENTRAL NERVOUS SYSTEM. ATLAS OF PHOTOGRAPHS OF FRONTAL SECTIONS OF THE CRANIUM AND BRAIN OF THE RHESUS MONKEY. Johns Hopkins Hospital Reports. Special Volume. Baltimore.

Two sections are here combined. First, a description of the Horsley stereotoxic instrument for accurate localization of extra cerebral and intracerebral correlations, as applicable in surgical technic, and secondly a series of photographs of serial section of the brain of the rhesus monkey originally started as a continuation of related cat sections from the Vogt laboratory and published here rather than in the Journal für Psychologie und Neurologie as a result of recent international complications.

Their interest to the neurologist is purely as references.

Stowell, W. L. SEX FOR PARENTS AND TEACHERS. The Macmillan Company, New York.

Of late years there has been a plethora of books upon sex. As Stanley Hall says in his introduction to his volume, many have been pernicious. This cannot be said of this very simple discussion of the fundamentals which underly the development of human beings and the ways by which human societies are built up. In all its simplicity, which is admirable, there is, however, one note lacking, namely, the great complexities which have come to be organized in this the most complex and intricate of all human mechanisms. For the be-

ginner, however, this work can be most heartily commended. May it form one of the links of a chain which will free mankind from his false modesty which is so largely capitalized and made the sport of demagogues and charlatans the world over.

Freud, Sigmund. DIE TRAUMDEUTUNG. Franz Deuticke, Wien. 1921. M.50.

A sixth edition of Freud's interpretation of dreams follows upon his fifth which appeared in 1918. To all interested in the advances made in the intense psychoanalytic work which has been stimulated by Freud's researches this new edition should be welcome. Although it appears more or less the same as the edition of 1918—which edition, by reason of war transportation difficulties, was available to few outside Germany, there are a number of valuable additions which make it indispensable to workers in psychoanalysis, and of value to the general reader. The entire literature since 1900—the date of the first edition—has been collected by Rank, and furthermore this same research worker has added a series of additional studies to Freud's original volume. These are of much originality and value.

Cotton, Henry A. THE DEFECTIVE DELINQUENT AND INSANE. THE RELATION OF FOCAL INFECTIONS TO THEIR CAUSATION, TREATMENT AND PREVENTION. [Princeton University Press, Princeton, N. J., $3.00.]

Cotton has here presented a very readable and constructive volume. He has accented a crying need in all of our institutional work — namely, aggressive therapy. He has applied this along lines which, to some seem exaggerated — what is not so considered by some others — to the end that many patients have been benefited.

Systemic infections undoubtedly may play a rôle in psychotic states — possibly such play an infinitely greater rôle for some than for others, for every individual is conditioned differently to different stimuli, whether such be atmospheric pressures, toxic substances, or social environments. One man's meat is another's poison, and an all-around vision of mental disorders must take into account, not only the personality makeup that enters into the struggle for personal and phyletic existence, but also of the possible environmental deterrants that may make the struggle ineffectual for this or that personality. It may be a great oversight to lay too much stress upon any narrow series of factors, but it certainly is an even greater evil to neglect everything and treat hospital patients simply from the boarding house economic point of view.

Toxic agents are among the obvious detrimental environmental factors. Remedy them at least, says Cotton, and with this we are in hearty accord. They may be the last straw that breaks the camel's back. We do not, with the author, believe they are as heavy burdens as he outlines — but no one can say how heavy they are unless they are at least removed as far as possible. Only a determination to get

rid of them can develop any true judgment — and the proof of the pudding is the eating. That a judicious appraisal of the whole situation is necessary, we believe, and the author is to be commended for his courage in going after things, which primary or secondary, nevertheless enter into a vicious circle of cause and effect, to the destruction of human beings.

Buckley, Albert C. THE BASIS OF PSYCHIATRY: A GUIDE TO THE STUDY OF MENTAL PROCESSES. [J. B. Lippincott. Philadelphia and London.]

The author in his preface makes an admirable appeal. He offers us a vision towards which psychiatry has been straining for a number of years, that fundamentally, as Maudsley, Mercier, Kraepelin, Freud, White, Meyer and others have insisted, each with their own terminologies, the problems of psychiatry, for the most part are those of behavioristic reaction, chiefly to social environmental factors. Sociotropisms they might be considered, and therefore are best studied as general biological reactions, in which that which has been so sharply differentiated by former generations as mind, is only a manifestation of these biological activities and can not be comprehended as something separate and distinct, as the faculty psychology attempted.

This favorable impression is carried through into the author's first historical introductory chapter, although this can hardly be said to deal with anything like an historical introduction into the development of psychiatry *per se*. It is only a statement that psychiatry is now, sometimes, regarded as a branch of medicine. Should the author look up our college curricula it would appear that it hardly has been admitted into medicine save here and there — but it is coming.

Chapter 2 deals with biological phenomena which an educated medical student should have obtained somewhere else,— so also the anatomical details of cerebral development and receptive organs. The bibliographies, as alternative reading are valuable but not discriminative enough. Chapters 4 and 5 deal with psychological factors. They are quite satisfactory, but still a trifle academic. We have come now to one quarter of the book. The author then takes up the subject of etiology. This too is very interesting, many opinions are expressed, but they are thrown more or less helter-skelter, more suggestive of the efforts of a clipping bureau rather than those of a carefully worked out discussion. When the author speaks of a lack of knowledge of mental diseases among civilized races, he is uninformed. Comparative psychiatry, though a young, is nevertheless a lusty child, and there are a large number of extremely interesting observations; Kraepelin's on the psychoses in Java, Brill on the Eskimo, to instance but two of the many studies.

Chapter 8 deals with Classification. The author reproduces that of the American Psychiatric Association of 1917. We are pleased to note the omission of the word *insanity* in this well presented chapter. Symptomatology, and Methods of Examination then follow.

These two might advantageously have been combined and the details of the Wassermann and other laboratory tests omitted, with a discussion of their significance inserted, such as are found later in paragraphs, as for instance, on the toxic-infection psychoses, p. 223.

These occupy one-half of the book. Part II, that now follows, discusses the psychoses in general following the A. P. A. scheme of classification. Here one looks in vain for any elucidation of the outlined scheme of reaching for a psychobiological formulation as an aid to the understanding of the mental reactions. As an example, one is told that "dipsomania is an extreme morbid craving for alcohol." Can a craving for alcohol have been integrated into the biological structures? We suspect not. The real craving is to get to a type of consciousness, in some way; the alcohol is simply the medium. One might go on to cite a number of similar survivals of the old psychiatry and indeed one searches in vain for the carrying out of the promise of the preface. It not only is not fulfilled, but apparently has been a quite forgotten, even if eloquent, gesture. Only in the chapter on the schizophrenias is a brief reference made to the subject.

We had hoped for a real radical rearrangement of the psychotic mosaics on psychobiological principles, such an one, as for instance Kempf has so ably sketched, but unfortunately only the old descriptive psychiatry of the Kraepelian or pre-Kraepelian period is offered us, and that none too connectedly. Albeit, the book is not by any means a negligable one, even if the promises were over ambitious.

Alexander, Hartley Burr. LATIN-AMERICAN. Vol. XI. THE MYTHOLOGY OF ALL RACES. [In Thirteen Volumes. Louis Herbert Gray, Editor; George Foot Moore. Consulting Editor. Marshall Jones Company, Boston, 1920.]

No one of this series of books devoted to mythology is better fitted to give genuine pleasure to the student or the general reader. The qualities which distinguish it even among the other excellent volumes of the series arise both from the author's equipment and from the range of his subject. The sustained literary excellence, his broad grasp of the genuine human interests here represented are devoted to the presentation of the mythology of a people who have a rich past to be explored. The author explains the choosing of a name for this study so inadequate to the comprehensive geographical as well as anthropological conception which he has of the peoples of America. Yet the name is not without significance if only for the reason that the Latin people, the Spanish themselves added more than a color to surviving myths. At the same time the background is one not only of a striking primitive lore, but also one of peculiar wealth of development in art, religion, political life. For there is a wide range of culture among these peoples reaching literally from pole to pole on the American continent. The writer recognizes the great distances which separated them geographically and in the different layers of development they had attained. Yet with this he recognizes a "racial complexion of mind . . . a kinship of the spiritual life" which gives a unifying appreciation to a study of the

northern American peoples (Vol. X.) The exceedingly valuable plates which abound throughout the book give evidence of the rich field mythologically and historically to which this book is devoted.

Hall, G. Stanley. RECREATIONS OF A PSYCHOLOGIST. [D. Appleton and Company, New York and London. 1920.]

One feels in this book the rich background of one who has spent many years in the accumulation of psychological knowledge and the development of psychological theory. Not only are psychic problems or psychic facts of various sorts admitted in the character sketches and descriptions of events which are here given. There is besides that broad sympathy of the author which enables him to view life in this deeper underplay of psychic factors as well as in its the superficial aspects which first catch the attention. One could wish that he had been less vaguely suggestive in regard to these deeper psychic questions and spoken with more of the distinctness which has been found so convincing in his more strictly professional work.

The longer chapter upon "The Fall of Atlantis" is a study of social evolution and degeneration of a fancied civilization. Its opportunities are similar to ours, the causes of its degeneration are those factors which can be seen at work to-day so that the story carries an intended warning. It gives food for thought though we may not find even here, the drawing of the picture as convincingly direct as one could wish.

Ferenczi, Dr. S. HYSTERIE UND PATHONEUROSEN. [Internationaler Psychoanalytischer Verlag, Leipzig and Vienna.]

Ferenczi is one of those writers whose words are concise and go straight to their point. He understands psychoanalysis so thoroughly that he brings it directly to bear upon the difficulties that come before him or upon the matters which he discusses. There is presented here a collection of studies, based upon practical experience, in regard to various phases of hysterical manifestation and other problems which come before the psychoanalyst. He presents a suggestive paper upon the creation of a narcissistic neurosis by the psychic trauma resulting from injury of any part of the body when there is already constitutional overvaluation of the self, when the injury threatens the existence of the ego or when it concerns a part of the body specially toned with libido. His brief report of his occupation with war neuroses is richly illustrative of the psychic disturbance to be sought behind the apparently physical symptoms. Even a superficial analysis reveals these and finds that they constitute an anxiety or a conversion hysteria in which the symptoms prove to have definite meaning.

Katz, Leo. MARGA ROTHER. DRAMATISCH-PSYCHOLOGISCHE STUDIE IN DREI AUFZUGEN. [Von Atlantik-Verlag, Berlin W. 1920. Pp. 54.]

Psychoanalysis makes us for a time self conscious of much that was once unconscious. The dramatist has frequently revealed this

in the attempt to utilize those unconscious factors which, only recently become known, have not yet found a sufficiently accustomed place in consciousness. Such a dramatist's psychoanalytic knowledge is clumsily applied. It is not so with this drama. One cannot know whether the author is making such an application or only intuitively bringing to light unconscious complexes. What he does is done deftly. He touches with truth the sister's absorbing love for the brother, its terrific power to dominate her life even to the point of a crime permitted by the overthrow of reason. He shows how such fixation is related to her withdrawal from the world, her attempt to find the unconscious wish in religion, to absorb it in music. The drama is too simply true to human reality to offend in its pathology. One feels the coming tragedy through the unhealthiness of the sister's love. Yet although the form of the tragic end is not suspected. It is in the very naturalness of human setting that the curtain is lifted to reveal these deeper factors which destroy life.

Pfister, Dr. Oskar. WAHRHEIT UND SCHONHEIT IN DER PSYCHANALYSE. [Rascher & Cie. Verlag, Zurich.]

Pfister makes no effort through this work to force truth and beauty upon psychoanalysis for its justification. The title might suggest this did the writing not come from one well known for the sincerity of his writing as well as his profound appreciation of the realities of life and their interrelation. In this brief study he has again presented these as the objects, the facts upon which the work of psychoanalysis is directed, for the discovery and understanding of which it stands as a science. Therefore the truth and beauty of which he speaks in relation to psychoanalysis are those that lie in facts. Facts are inescapable at least for the scientist who is in earnest. It may be that in their uncovering, ugly phases must appear. They must even be dealt with. Yet if the reason therefor be that of a readjustment in the interests of esthetic comprehension of life, intellectual clearness and ethical mastery of life's instinctive forces then the goal is that of beauty in the truest sense. It lies in the whole of truth. Beauty thus comprehended finds its attainment in that fuller truth shown to be the goal of psychoanalysis. The book contains in its small compass much richness of material in clear exposition.

Hoch, A. BENIGN STUPOR, A Study of a New Manic Depressive Reaction Type. [The Macmillan Co., New York, 1921. 284 p. Price $2.50.]

This little book comes to the many who counted Dr. Hoch among their friends as a pleasant surprise, a sort of renewal of a valued association. It is a clinical study in Dr. Hoch's best style, an analysis of the benign stupors, and an attempt to define their characteristics, to differentiate them from the malignant reactions of similar character and to explain their mechanisms and their symptoms in detail. It was characteristic of Dr. Hoch that he kept close to his case material

and this study is no exception to that rule. It is a closely analytical study of actual cases and represents American clinical psychiatry at its best. It is a distinct and original contribution of great value, full of stimulating suggestions and interpretative hypotheses and free from the restrictions incident on attempting to force cases into some accepted nosological group. Dr. Hoch was singularly free from the domination of systems of classification and was able therefore to consider each patient as an individual problem, free and untrammeled by the prejudice of having to apply a conventional label.

The book is made up of material which was gathered from Dr. Hoch's notes after his death by Dr. MacCurdy. Dr. MacCurdy's work has been most admirably done and any hiatuses in the notes which may have occurred are not apparent to the reader. He is to be congratulated for a good job well done.

And finally, the book emphasizes again the serious loss to American Psychiatry by Dr. Hoch's death. Had he lived we might have all benefited by a number of such illuminating studies, as it was Dr. Hoch's intention to devote his time largely to the careful study of the rich case material which he collected during his clinical experience. WHITE.

Janet, Pierre. LES MEDICATIONS PSYCHOLOGIQUES. ETUDES HISTORIQUES, PSYCHLOGIQUES ET CLINIQUES SUR LES METHODS DE LA PSYCHOTHERAPIE. [Felix Alcan, Paris.]

This three volume treatise is most entertaining and profitable, albeit there are many, too many words. They contain an excellent digest of current winds of psychotherapeutic doctrine. In most instances the author has made, to us, a satisfactory and reasonable estimate of the forces at work in this most important field of medicine. In some Janet has completely failed to entertain useful bypotheses or to outline correctly well known principles. His ignorance of the Indo-Germanic tongues makes him strangely oblivious to most excellent work in psychopathology which has been progressing in Austria, in Germany, Holland, Norway and Sweden. When he has called attention to these it is obvious that his information concerning them has been obtained from second-hand and quite inadequate sources. Thus his idea of the use of Jung's association experiments is quite nonsensical, and his survey of the psychoanalytic movement absurd if not maliciously maladroit.

Perhaps it is too much to ask that a work published in 1919 but which consists of a series of re-edited lectures dating from the year 1904 should contain matters of psychopathological importance up to date. At any rate they are not, although they are most readable and are an excellent example of Janet's quite extraordinary skill in presentation. Because of his grace of expression much can be overlooked in the way of erudition or scientific curiosity.

Henschen, Salomon Eberhard. Ueber Aphasie, Amusie und Akalkulie. Ueber Sensorische Aphasie, V & VI Teil. [Nordiska Bokhandeln, Stockholm.]

Henschen here contributes two more quarto fascicles to his previous researches on the Pathologie des Gehirns.

We should like to give to these two works the space their merit deserves but this is impossible in view of the avalanche of new works which should be brought to our readers' attention.

Henschen, as is well known, belongs to the anatomical school, as contrasted to those who believe, like Head for instance, that the aphasia problem is primarily a psychological one. Basing his studies on the cytotectonic of Brodmann and other students of cortical topography Henschen would apply these ideas to the study of the various aphasias. He traces the aphasic localizations up from gesture localizations applying Wundt's ideas concerning the origin of language. Word blindness and word deafness have quite different cortical areas, the former being associated with lesions of the left angular gyrus, the latter related to lesions of the posterior two-thirds of the first left temporal convolution.

We can not here trace out the many, details arising from the author's masterly review of all of the known case histories, which although at times rather scantily abstracted, yet nevertheless present an imposing array of evidence.

The whole study is most fascinating, especially the author's discussion of educability of the right hemispheres and the part they could be made to play in the general intellectual synthesis. They are an almost uncultivated field and can be much more zealously used for the preservation of racial experience.

Hall, H. C. La Degenerescence Hepato-Lenticulaire, Maladie de Wilson. Pseudo-sclerose. [Masson et Cie, Paris.]

This delightful monograph of 350 pages on various types of lenticular-liver degeneration, with a graceful introduction by Pierre Marie, comes as a welcome summary of our knowledge concerning this important and interesting group of syndromes.

Hall has collected the case histories of about 68 cases with at least 23 autopsies, 16 of which are quite detailed. Of these 3 are from his own hospital service in Denmark.

He begins his study with a short resume of Wilson's descriptions in *Brain* and also an analysis of the same author's important monograph in the Lewandowsky, *Handbuch*. Chapter II deals with the historical evolution of Wilson's disease and that of the pseudosclerosis of Westphal and Strümpell. Personal observations on seven cases constitute the next chapter which is followed by a synoptic table of the cases of Wilson's disease and of pseudosclerosis published since 1912. The symptomatology is next considered in great detail. Chapter VI deals with the pathological anatomy. This is a most valuable chapter. The next on the corneal pigment brings a number of new observations within the clinical picture.

Chapter VII takes up the relation of Wilson's disease to Ziehen's torsion spasm. Thomalla's dystonia lenticular synthesis does not entirely satisfy him and in his next chapter the whole group of striatum syndromes is most intelligently discussed. Hunt's work is known and appreciated by the author.

The complexity of the whole situation is most adequately set forth by the author. He is inclined to separate out a distinct familial group which includes both Wilson's disease and many pseudosclerosis cases in which heredity is conceived to play the chief causative role. This type is to be considered a congenital constitutional anomaly, an abiatrophy, in which the hypothesis is advanced that the disease is produced by the union of two genes, one of which is spread in a general manner in the population of the locality and transmitted by dominance or by recessive heredity, the other is of specific family importance and is a Mendelian dominant factor. The mesencephalic and liver factors are considered as parallel processes, both of which are due to congenital debility of these organs.

The monograph is well worth reading. The reviewer feels that the author has not laid enough stress upon the idea that there may be a closer relationship between the striatal pathology and a trophic reaction in the liver, viewed from the standpoint that important synaptic integrations of upper vegetative neurons have been interfered with. This would afford a more monistic view of the whole group, but considering the as yet sparse collection of data regarding upper vegetative pathways it is perhaps safer to stick to the older orthodox heredity schemes of interpretation, even if they do not explain anything.

Long, Constance E. Collected Papers on the Psychology of Phantasy. [New York, Moffat, Yard and Co. 1921.]

The writer of this book has a broad grasp of the fundamental principles of analytical psychology. She knows how to bring them to a variety of readers in a direct form which makes them applicable to a variety of practical needs. The book in its appeal to the educator or other social worker as well as to the medical student of these principles of the psychology of the unconscious is simple, readable, forceful. Dr. Long speaks from her own wide range of interest and from her own medical experience as she watches this psychology taking hold of the difficulties in human lives.

She has conceded the term analytical psychology for she frankly stands for Jung's particular development of the psychology of the unconscious rather than that of Freud. She is however acquainted with the basic discoveries upon which all of the branchings of the original psychanalytic theory rest and freely acknowledges the indebtedness for these to the genius of Freud's research. She makes an acknowledged effort constantly to give due credit to freud and point out his specific contributions in this application of the psychology of the unconscious. She also takes pains to state the leading principles of Jung's line of thought so that the comparison gives the book a special interest as it comes from the pen of one whose work

proves that practice and theory are united. She is less clear however in this setting forth of Jung's position than in the application of the psychology to practical questions. Is it only a Freudian prejudice that makes one see more clearly through her writing just where the fundamental difficulty lies which has caused the deviation? This difficulty serves to make Freud's fundamental position incomprehensible to Jung and his disciples and it sends them into somewhat metaphysical flights of thought. The extreme simplicity of Freud's initial conception is that the whole psychic life, call it libido or what one will, is included in two fundamental instincts which start out in extremely close relationship and out of which all else arises. Failing to grasp this, these critics do not see why sex prevades all expression and why analysis must always discover sex at the root of all manifestations. This simple fundamental statement of Freud obviates the confusion that arises from the attempt to explain other groups of impulses by the side of the reproductive instead of within it. The use in the book of both the terms, subconscious and unconscious, also does not tend to clearness of understanding.

Bayliss, W. M. PRINCIPLES OF GENERAL PHYSIOLOGY [Longmans's Green & Co., London and New York. $9.50.]

It is but a short time since we reviewed an earlier edition of this really remarkable book; a book which we repeat is almost an absolute necessity for any worker in neuropsychiatry at the present time. No one has so adequately discussed the trends that modern studies in physiology are taking us—particularly in the increasing necessity for following out the neurological processes within the body. Although even Bayliss himself has not quite adequately stressed the full significance of the organism as a whole, made so by the masterly organization effected by means of and through neural structures, by which it captures, transforms and delivers energy for the preservation of the individual, and even more important, for the continuance of the phylum, even if this larger view point is not always in mind, yet the general attitude comes much closer to it than any contemporary work.

We welcome this new edition, although we should like to see an entire revision of the vegetative or visceral nervous system, especially showing its automatic activity in relation to the older phyletic metabolic integration. When Bayliss, following Langley and many others, speaks of the vegetative system as an outflow from the sensori-motor system we think him distinctly wrong. It is not in the Poriferae or Coelenterates. It is a primary system; the sensori-motor system is the secondary one. This is a distinct lack in the book for the neurologist. A number of minor subjects might be taken up—thus Bloch's interesting researches on the skin pigments as light receptor mechanisms, the relation of this pigment to adrenalin, and the whole problem of sympathetic upkeep through the external stimuli as well as through the chemical sources of energy. We would also like to see a more progressive attitude towards the whole energy transformation possibilities in other terms than carbon

and oxygen. If Sir Oliver Lodge is correct when he says that millions of foot pounds of energy are locked up in a common crayon, certainly calcium plays some part in the energy formulae of the human body, and why not sodium, or potassium, and iron and all of the 26 integrated chemical elements. What are they there for? Certainly they are not museum pieces for biological chemists to look at.

In a new edition we would like to see a better discussion of the relationships of tonus, the proprioceptive system, the labyrinth and the mechanism of sound and voice—for the correct appreciation of which the Dutch physiologists and neurologists have led the way. The work of Kappers and the significance of neurobiotaxis certainly should be incorporated and the masterly studies by Winkler, Magnus, deKleyn, and the Dutch school on the 8th nerve in its relations to space orientation and the projicient apparatus acting through the sound receptors and developed to integrate through the symbol.

JELLIFFE.

Abraham, Dr. Karl. KLINISCHE BEITRÄGE ZUR PSYCHOANALYSE. [Internationaler Psychoanalytischer Verlag, Leipzig, Vienna, Zurich. 1921.]

This collection of papers fulfills its purpose in a particularly happy manner. Abraham has collected out of an experience of fourteen years material which brings forward and illustrates many questions which arise before the psychoanalyst. These may occur as one considers the applicability of psychoanalysis to any number of current problems or they may be those which have a specially acute bearing upon some matters arising in actual daily work with patients. Here in fact the author has faced the problems he treats. In either case the psychoanalyst will find here treatment of a wide range of such subjects and given in a manner brief, clear, straight to the point. The collection of papers is one that can be picked up for a moment's helpful reading or for a more prolonged study into the matters and methods of psychoanalysis.

Pfister, Oskar. ZUM KAMPF UM DIE PSYCHOANALYSE. Internationaler Psychoanalytischer Verlag, Leipzig, Vienna, Zürich.

Pfister writes of psychoanalysis not merely with a knowledge of its principles theoretically acquired but because he has had successful experience with it in the fruitful field of work with the adolescent as well as with other individuals. He is also well fitted to make the comparisons to which he has here given careful attention as he points out the relation of psychoanalysis to other fields of thought and endeavor. He appreciatively reveals the common meeting ground where the end desired and achieved is the same, he points to the marked divergences with a fearless criticism of methods which psychoanalysis feels bound to supplement or even to supersede; he reveals the interpretative light which psychoanalysis is able to throw upon some of these older methods. Thus he speaks intelligently of the work of "experimental psychology," of its failures as well as its

limited successes. He shows why a more vital psychology gives greater promise for human interests even while acknowledging the attempts of the earlier school. Pfister discusses psychoanalysis in the same manner in its relation to ethics and other philosophical or metaphysical fields. He also enters more fully into the matter of the unconscious and other psychoanalytic principles. He treats furthermore of the special contributions which certain individuals have made toward psychoanalysis or in related fields of psychology. He presents many practical forms of problem which have demanded psychoanalytic attention. His work is well illustrated with material from his own experience to lend weight to his merely theoretical presentation. Here is a work all analytically interested students can read with stimulus and profit.

Stekel, Wilhelm. ONANIE UND HOMOSEXUALITÄT. 2d Edition Improved and Enlarged. Urban and Schwarzenberg, Berlin and Vienna, 1921.

Stekel has turned again to the treatment of certain important phases of the psychosexual life and the problems that they present to the psychotherapist. He has given in this book a separate discussion of onanism or masturbation and of homosexuality as of two phases of far more prevalence and importance than had once been considered. He is interested with their place within the development of every life especially as the increasing pressure of modern civilization rests heavily upon the growth and the exercise of the sexual instinct. Onanism is an inevitable and a useful outlet in a direct form or in an indirect displaced form at some time in the individual development, perhaps more or less continuously. Homosexuality is not only a natural phase of development but becomes accentuated, becomes in some lives perhaps inevitably established because of the increased pressure of the conflict between the sexes. It may be an expression of an intensified sadistic attitude growing out of an early hatred directed toward the opposite sex. This too is a condition which becomes more intensified as civilization drives the sexes farther apart. Stekel is not unmindful of the many intricacies and variations in the building of the homosexual attitude and its finding expression in the neuroses. These vary in the relation to either parent, in individual experiences, in the course which the individual may follow in his adjustments or in the building up of his neurosis. The problem is a complex one. One may not agree with Stekel's emphasis upon the impulse of hate as a primary thing or in full with his attitude of approach to the problem. Yet his review of the situations in regard to both his subjects helps to bring the importance of these matters before us as actually existing and widespread factors in every life. They are of pressing importance for the psychoanalyst. Therefore the discussion and clinical material here presented add to our knowledge and insight.

DR. PEARCE BAILEY

DR. PEARCE BAILEY

It is a sad duty to chronicle the death of Dr. Pearce Bailey at his home in New York on February 11 after a week's illness with pneumonia. He had a similar attack two years ago from which he fully recovered.

Dr. Bailey was born in New York July 12, 1865. After graduation from Princeton in 1886 he began the study of medicine at the College of Physicians and Surgeons. After taking his degree there he served as interne in St. Luke's Hospital and studied abroad in Paris and Vienna before settling down to practice neurology in New York. He was one of the assistants at the Vanderbilt Clinic under Prof. Starr and became later [1906–1910] Adjunct Professor of Neurology at Columbia. He occupied the position of consulting neurologist to the New York, Roosevelt, St. Luke's, Orthopedic, Manhattan State and St. John's Hospitals. He served as President of the New York Neurological Society for two years, and later was President of the American Neurological Society. He was with Drs. Collins and Fraenkel one of the three founders of the New York Neurological Institute, the only hospital for nervous disorders in the United States. During his incumbency in these various positions he wrote many valuable papers on neurological subjects which were published in various medical periodicals and sometimes collected together as in the case of some volumes of records of the Neurological Institute. His book, *Accident and Injury, Their Relation to Disease of the Nervous System,* was published by the Appletons in 1898 and remains to this day an authoritative work on the subject.

There are three directions in which his work carried him that may be considered outstanding landmarks in his career: The Neuro-Psychiatric Service of the World War; the work on Mental Defectives for the State of New York, and the Classification Clinic, three accomplishments of great importance, three achievements which will distinguish him in medical history.

Surgeon General Gorgas called Dr. Bailey to Washington as we entered the war and asked him to take charge of the Neuro-Psychiatric Service of the vast and growing army of the United States. He was the head of this department throughout the war, attained the rank of Colonel and received the distinguished service medal in

recognition of his work. He created a new department in our armies, one that had to do with careful selection of men, the elimination of the unstable and unfit, the segregation later and the medical treatment of those who failed to keep their morale or fell victims to neuropsychiatric disorders. The success of the department in this country and overseas is too fresh in our minds to be forgotten. His work in the department formed the basis for the extreme psychological tests inaugurated later by others.

At the close of the war he accepted the appointment of chairman of the New York State Commission for Mental Defectives at the hands of Governor Smith, and continued in the office at the solicitation of Governor Miller. He has accomplished much for the amelioration of conditions in institutions for the feeble-minded, laid the foundations for future progress in State supervision and care, and it is owing to him that a new State institution to segregate the defective delinquent has just been established at Napanock.

The third accomplishment of his life, and perhaps destined to be his most important achievement, was the inauguration of the so-called Classification Clinic in East 80th Street. It was his dream that there should be psychological laboratories for the purpose of examining all young people, normal and abnormal, in order to determine their mental standing, their efficiency, their aptitudes, to ascertain whether from the standpoint of human economy a young man or young woman should be given college training, and to discover if possible what vocations they should follow. This is no doubt a beginning in a great field of psychological service to the State, and it was his belief that ultimately every University would have such laboratory centres, to which the whole people might have access.

Outside of his strictly medical work, Dr. Bailey had a wide interest in the arts and literature. As one of the founders of the Charaka Club [a club whose membership is made up of physicians with interests in medical history, the arts and letters], he was a frequent contributor to the pleasure of its meetings through essay, short story or play, and his writing was characterized by an unusually clear cut, finished and dramatic style. Some of these contributions are to be found in the printed volumes of transactions of the Charaka Club.

His death leaves his two sons and two daughters, all under age, orphans, as their mother died over ten years ago.

Dr. Bailey was a rare man in point of honor and integrity of character, an example of loyalty to friends, a hater of the merely plausible and insincere. Of Huguenot extraction, he had much of

the old-time Marquis about him, the lean aristocratic features and figure, the eagle eyes which saw through everything, the keen, quick intelligence, the rapier-like wit, the cynical humor, the courage to endure many sorrows, the sensitiveness of a gentle, tender, generous human soul.

FREDERICK PETERSON.

PEARCE BAILEY.

We are not alone in mourning the death of Pearce Bailey. His influence had extended itself into such widened circles that many must testify to the loss that is suddenly felt among us. Only one week of illness with pneumonia removed him from the very midst of his activities in which he was fruitfully engaged. Yet it is in accordance with the spirit of quiet fortitude in the face of calamities, which could never turn him from his self-contained devotion to his activities, that we too should turn our attention from his death to his life. The former stirs us to a sense of personal grief which is a deserving tribute to the man who has gone in and out among us. Yet his life is that which he has given us, and in the further promoting of its activities we efface the sense of mere loss.

Pearce Bailey was a man whose personal traits of character made the sort of impress which was a quiet reminder of the enduring virtues, as gentle yet sure in its influence as were the words with which he brought that influence to bear directly upon us. His activities, moreover, particularly those of the later years of his life, were of so definitely serviceable a nature, so promotive of needed reform, that our best tribute is the enlistment of our interest upon his unfinished work.

Pearce Bailey was born in New York City in 1865. He received from Princeton University in 1886 the degree of Bachelor of Arts. In 1889 he completed his course of study at the College of Physicians and Surgeons, Columbia University, receiving the degree of Doctor of Medicine. His studies were supplemented by medical work in Vienna, Munich and Paris. He had turned his medical interest chiefly to the field of neuropathology and organic neurology, although his attention was also directed to traumatic and surgical phases of neurology. His one book, published in 1898, and remaining a standard to this day, deals with traumatic questions. Its title is *Accident and Injury; Their Relation to Diseases of the Nervous System.* He wrote also many papers, monographs and brochures upon neurological subjects, these in later years showing increasing

interest in neuropsychiatric problems. In most recent years, in connection with his wider social service in neuropsychology, his ready pen as led him into articles of a still more popular character whereby he has sought to arouse the public to the practical sociological side of neuropsychiatric problems. Notable among these articles is the one in a recent issue of the *New York Tribune* in which he demands attention to the question, "Shall the State Kill Children?" His writing is a protest against the execution for murder of two citizens of the State who though adult had the intelligence of the age of 6 years. He was one of the editors of the "Archives of Neurology and Psychiatry" at the time of his death. He was a writer of distinction in the non-medical field, having a warm play of imagination with a keen dramatic instinct in the writing of short stories. Even in these there was more than a mere literary charm, for it was inevitable that there should be a profound even though lightly delicate touch upon some of the psychological problems that exist in men and women. Perhaps his intellectual power with his brilliancy of writing is nowhere in greater evidence than in his study of "Voltaire's Relation to Medicine" found in the Annals of Medical History for 1918.

Doctor Bailey's early occupation with neurology led him to the Vanderbilt Clinic, where he was made Chief of the Clinic and later Adjunct Professor of Neurology in the College of Physicians and Surgeons, of which the clinic is a part. At the time of his death he held the post of consulting neurologist to St. Luke's, Roosevelt, New York and other hospitals in New York City. He was President of the New York Neurological Society in 1903 and 1904 and at one time President of the American Neurological Association. He was a member of the American Medical Association, of the Pathological Society, and of the New York Academy. He was also on the Commission of the Association for Research in Nervous and Mental Diseases.

His chief energies were given in the past to the establishment and development of the Neurological Institute, the only institution of its kind upon the American Continent. This was the development of an idea conceived and carried out by him in connection with Doctor Collins and Doctor Fraenökel. The usefulness of such a concentration and coordination of neurological facilities and forces proved itself, as this became the starting point of the wider service developed from it when the World War called our troops to its service. It was then Pearce Bailey who assumed the chief burden of organizing such service for this unexpected extension of activities.

He showed himself indefatigable in his investigation into methods and means for the carrying out of so gigantic a task. He manifested an administrative ability which soon received recognition from Washington in the call to definite service as head of a Neuropsychiatric Department, an organization which owed its recognition as an integral part of preparation for war and for the health of the troops to the work which Doctor Bailey had already carried forward. It was his ability also to see a problem in its entirety, to grasp quickly all its possibilities and the responsibilities that resulted from these, that led to the development of the service in the lines which came to distinguish it. These were the elimination of the psychically and nervously unfit; who without such keen investigation as they now received could too easily pass muster. They were also the care and reconstruction of such as had broken down psychically under the severe tests which actual service put upon them. The value of his services was attested by his appointment to the rank of Lieutenant-Colonel and later to the full rank of Colonel. At his dismissal he was awarded the Distinguished Service Medal.

The activities in this war service led Doctor Bailey on into other important fields. The determination and the intellectual keenness which he gave to these new projects stamp them as monuments to his own original personal genius for practical service. His work with the men of the army gave impetus to a similar type of work toward which his interest tended, that of the establishment of a Classification Clinic to be a department of the Neurological Institute. This clinic was to help adolescent boys to find their most effective place in life, to measure their capacities for different fields of work, and to discover whether they were fitted for college education or not. For Doctor Bailey based his idea upon the psychological distinction which must inevitably exist between different individuals and which the conventionalized standards of society too greatly overlook. He wanted to eliminate the failures which occur because what is expected of boys and girls is not measured according to their actual and greatly varying individual capacity. His hope was that such a work would in time extend itself into a chain of laboratories of investigation with at least one in connection with each University.

Meanwhile he was urged to enter a field of service for the State, a field which was new and difficult but which therefore demanded just the wisdom, courage, broad vision and initiative which were his. So he was made Chairman of the New York State Commission for Mental Defectives from which Dr. Walter R. James had recently resigned. His most marked accomplishment in this service was the

attainment at last of the segregation of defective delinquents which he maintained should not be treated with or as ordinary criminals. So the establishment of a new State institution at Napanock for just such segregation became a definite result of his efforts. He did much besides in awakening interest to this important phase of social duty. He not only directed the attention of the State authorities and of the general public toward it, but he actually set in motion those definite projects for supervision and care of the feebleminded which have already brought about amelioration of the conditions that surround them in the institutions for their care. His work has been specially commented upon by Governor Miller of New York, under whom he continued in office, having been first appointed by Governor Smith.

Pearce Bailey was distinguished by a character unswerving in its high principles. This character was always the same, therefore, in its impress no matter in what relationship it was manifested. As Chief of the clinic, in the hospital ward, in organization and carrying out of his larger activities, the same qualities commanded the cooperation and the sincere respect of his colleagues or of those working under his direction. The same might be said of his friendships. Loyalty, sincerity, broad-minded tolerance of others even when they were in fault, kept him always affectionate toward his friends. Insistence upon the same sincerity in others and genuineness in mastery of facts characterized his direction of the work of others. His ready humor, even though cynical at times, was yet always gentle and kindly. His clear intellect could turn his ready sense of fun into telling wit when occasion required. Yet this was never a weapon to wound. His spontaneously generous spirit was able rather to enlist the hearty enjoyment even of the one whom the humorous attack might involve. He could not endure falsehood, insincerity, sham; even the outpourings of ungrounded enthusiasms offended him. Yet he was never the bitter opponent but he had a reserved attitude which brought conviction through the integrity of his own character, on which it was based, and through his own quiet assurance in his point of view.

He had a keen intellect and one which grasped a problem in its entirety. At the same time he was never hasty in making a diagnosis or in assuming a theoretical attitude without his own broad consideration of facts. Even then there was no arbitrary finality to his convictions. As a teacher he expounded in the same clear, convincing manner though he had no particular pedagogical aptitude or interest. He had a receptivity of mind as facile as was his varied

means of expression. The ability to originate and develop such means of expression seemed to increase rather than diminish in his later years. In his earlier years it might have been objected that he was too ready to take up a new interest and as easily lay it down. But he has proved himself both tenacious and efficient enough in matters which were worthy of pursuit and which contained possibilities of development for the future.

Pearce Bailey was by birth and cultivation a man of genuine nobility. Though reserved, his personality was not separated from his fellows. His qualities were actual forces which inevitably expanded themselves in a hospitality toward other men and toward the impressions of experience to bear fruit in a service of present and future possibilities. He met with great losses in his own life. As they were never permitted to check his usefulness toward society so our loss is the incentive to take up the work that he has left. Only through such a continuation of his activities can the promise that he foresaw grow to fruitful fulfilment.

SMITH ELY JELLIFFE.

DR. PEARCE BAILEY

Death has claimed Pearce Bailey. On February 11th, after a week's illness, contracted in the performance of his duties to the State's indigent defectives, he succumbed. This terminated a life that was full of unselfish work for the advancement of his fellowmen.

Dr. Pearce Bailey was born in New York, July 12, 1865. He graduated at Princeton University in 1886 with the degree of Bachelor of Arts and from Columbia University, College of Physicians and Surgeons, in 1889, with his degree of Doctor of Medicine. He spent some time abroad at various times, chiefly in Paris and later in Munich with Krapelin. His activities in his earlier years were at first in purely neurological fields; after having graduated at the College of Physicians and Surgeons he interested himself in the neurological clinic of that University, where he became successively Chief of Clinic and Adjunct Professor of Neurology. Dr. Bailey was President of the New York Neurological Society in 1903 and 1904. Later, in recognition of the necessity for a neurological hospital in this city, he became one of the founders of the Neurological Institute—to this day the only institution of the kind on the American continent. He was also consulting neurologist to St. Luke's, Roosevelt, New York and other hospitals at the time of his

death. Dr. Bailey was a member of the American Medical Association, former President of the American Neurological Association, President of the New York Neurological Society, member of the Pathological Society and of the New York Academy of Medicine. He was also on the Commission of the Association for Research in Nervous and Mental Diseases. Dr. Bailey devoted his energies to the development of the Neurological Institute with all the force and vigor and initiative that in him lay; and the wisdom of his course and that of his colleagues in the recognition of the necessity for such an institution was borne out from the very entrance of America into the great war, for it became one of the important centres in the country for the instruction of medical officers in neurology and neuropsychiatry. Pearce Bailey was appointed to the Surgeon General's office with rapid promotion to a colonelcy, in charge of the neuropsychiatric department—a new venture in modern warfare, and indicative of a tremendous advance in the selection and medical care of troops. He soon became the chief exponent of the importance of the proper elimination of the unfit and of the reconstruction of the disabled, shell-shocked troops; and for his brilliant service to the country Congress awarded him the Distinguished Service Medal.

After his retirement from the Army, Dr. Bailey, again with a spirit of self-sacrifice, undertook to establish the Classification Clinic—a department of the Neurological Institute—through whose means he looked to help adolescent boys make the most of their possibilities in life by a proper measurement of their capacity for different fields of work, especially with a view to separating the college-fit from the others. At the same time he was appointed by the Governor of the State to the Chairmanship of the State Commission for Mental Defectives. He was indefatigable in his attempts to make the State accept the difference between mentally defective delinquents and criminal delinquents, and his efforts to have these classes separated were being crowned with success when his time came.

Those of us who have known Pearce Bailey intimately realize the irreparable loss that his absence means, not only to American medicine, but to all who valued truth, independence of thought and fearlessness in its expression. He was the foe of sham; he never could bring himself to listen without evident impatience, or to read without chafing under it, the outpourings of the impractical, the hyperbole of the self-deluded enthusiast. Governor Miller of New York State said of him: "Dr. Bailey was a man who possessed the very rare combination of public spirit, broad vision and practical

common sense." Nothing was more characteristic of him, after some long defence of a far-fetched, fanciful diagnosis by some member of his staff at rounds, than his smiling, indulgent query, "Do you really believe it yourself?" It was said so gently and smilingly, with no hint or suspicion of irony, that even the victim joined in the hearty laugh that followed. This indeed was one of Pearce Bailey's great qualities—he told the truth at all times fearlessly, regardless of consequences, but never in a way that hurt. And he always told it interestingly, with charm and grace of manner and speech. He never wasted words; indeed, some of his communications were more than laconic. One postal, mailed from the Surgeon General's office to the Military Director of the Neurological Institute, in answer to a request for a report on a certain medical officer, contained the following: "N. G. per S. G. P. B." We all loved him; on regular division rounds there was always the eager question, "Isn't the Chief coming to-day?" with disappointment on every face if the answer were, "Not to-day." He personally helped every one of his staff in every possible way; he practically never found fault in words, but his expression of countenance when his orders were not carried out, his evident feeling that he was not being properly assisted, made the guilty man so ashamed of himself that no other reprimand was necessary.

His analysis of a case at the bedside was interesting. He spent the larger part of the time in getting a complete history of the salient, the essential facts. His physical examination was quite secondary. It was part of his theory in diagnosis that the history was the all-important matter—most cases that could be diagnosticated at all could be determined from the history—and the examination was but a check on the historical interpretation. At least, the history would delimit the case within reasonable bounds. It was surprising to see how successfully Dr. Bailey's theory worked out when he himself carried out the examination. He was broad-minded and would allow any member of his staff to voice his opinion about a case even though diametrically opposite to his own; but reasons would always have to be advanced—and good ones—or by a few trenchant words he would be completely subdued But the utmost good humor prevailed always.

Many of the meetings of our societies were graced by his genial presence. His presentations were always of the highest intellectual character, and he was a master at bringing at once into prominence, by some ably coined phrase, the point to which he wished to draw attention. One of his very latest articles, that appeared in the

New York Tribune a few weeks ago, had for a title, "Shall the State Kill Children?" At once the query became a plea to save from capital punishment those adult criminals that had the intelligence of the child. He had a way of going at once to the salient points of a discussion, avoiding all side questions and issues. He was an ardent searcher for the truth and discarded everything that seemed merely adventitious to such search.

The sorrows that Pearce Bailey knew in his private life were many; at no time was he free from them—there was no respite, but none could see their reflection depicted on his countenance, and few knew.

There is appended hereto a list of the many brochures, monographs and papers of which he was the author. They vary from earlier reports in the field of pathological neurology to the recent publications in neuropsychiatry. His one book, which still is regarded as authoritative in its field, was first published in 1898—*Accident and Injury; Their Relation to Diseases of the Nervous System.* He was also one of the editors of the "Archives of Neurology and Psychiatry."

The Charaka Club, which boasts of such members as S. Weir Mitchell and Sir William Osler, also knew Pearce Bailey, one of its founders, as one of its brightest intellects. His stories and plays, which frequently graced the pages of its publication, were always of dramatic virility and force. "What he wrote for us was unique in its style, in its keen psychological analysis and dramatic finish, and has an enduring place in our hearts."

Dr. Bailey was the son of William E. Bailey and Harriet B. Pearce. His wife, who died some ten years ago, was Edith Block of New York City. He is survived by two sons and two daughters.

We, his friends and associates in New York City, are deeply conscious of the great loss we have sustained in the death of Dr. Pearce Bailey. His keen intellect, his wit and humor, his integrity of purpose and character, his attainments in the fields of neurology and neuropsychiatry, in the service of our country, compel our profound admiration; and we wish to express and record herewith our deep grief at the loss of a colleague, a friend and a great American.

WALTER TIMME, M.D.

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WILHELM ERB.

The death of Wilhelm Erb in 1921 at the age of 81 removed one of the best known figures in German neurology. This place he had won not merely by the important work he had accomplished but from his distinct personality. This expressed itself in his manner of work and in the clarity and certainty with which he obtained his

LE PROFESSEUR ERB
(d'Heidelberg)

results. These same elements stamped all his personal relations. They marked him as a man who was a representative leader in the field of exact science. Erb set his face against everything tending to a mystic reliance on the unknown. His science was like his own character, a matter of surrender of impulsive speculation, of mere tendency in hypothesis, to the austere guidance of the law of intellect. His creed was one of action upon circumstances, never of passive dependent faith or submissive inaction.

He was interested in direct observation valuing only that which could be actually brought under sense perception. Yet in accepting such material in the interests of his science he knew how to coordinate it, rearrange it in interpretative form and so to make clear problems hidden under confused symptomatic pictures or definitely to further progress in the realm both of anatomical and clinical research. His scientific severity of ideal gave him the aspect of gruffness but this only concealed a kindliness which belonged to his genuine interest in his work and in those who shared with him the advance of neurology. His interest in his patients as in the students to whom he was an inspiration was that of a sincere scientist and a genuine lover of humanity. He was peculiarly fitted to be a thorough clinical investigator, a sure diagnostician and an inspiring teacher.

Erb was born in Bavaria in 1840. He entered the University of Heidelberg at the age of 19. From there he proceeded to Erlangen and took his degree finally at Munich in 1864. He returned to Heidelberg as teacher of medicine and for a time was director of the Medical Polyclinic at Leipzig. Most of his life was spent in service at Heidelberg where he was made Professor Ordinarius in 1880 and Director of the Medical Clinic in 1883. He was sought after by Bonn, Leipzig, Vienna and Berlin but preferred to devote his life to the service in Heidelberg.

He contributed many writings to the subject of internal medicine but he is best known for his special contributions in the knowledge of nervous disease. He published many monographs among which may be mentioned his works on "Tabes Dorsalis", "Der Thomsensche Krankheit (Myotonia congenita) Dystrophia muscularis progressiva". Larger works are his "Handbuch der Krankheiten der peripheren cerebrospinalen Nerven", "Handbuch der Krankheiten des Rückenmarks und des verlängerten Marks". Important also is his "Handbuch der Elektropherapie". Many other writings might be mentioned from his active pen. He edited with von Bergmann and von Winckel Kolkmann's "Sammlung klinischer Vorträge" and was one of the founders and editors of the "Deutsche Zeitschrift für Nervenheilkunde".

VOL. 55 APRIL, 1922 No. 4

The Journal

OF

Nervous and Mental Disease

An American Journal of Neurology and Psychiatry, Founded in 1874

ORIGINAL ARTICLES

DELIRIUM ACUTUM AND PRIMARY SINUS THROMBOSIS*

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The pathological anatomy of the syndrome *Delirium acutum* has already been studied by many investigators. The special reason why we once more call attention to the changes in the central nervous system in such cases is, that we have occasionally found in the post mortem examination an extensive thrombosis of the sinuses of the brain. This thrombosis was non-purulent and belongs to the group of the primary autochthonous form. The usual causes of sinus thrombosis (anemia, etc.) were missed in our patients and therefore we have examined the central nervous system in detail. To begin with we shall describe two of the most typical cases.

Case I. Historia Morbi of Mrs. L.: age 50 years.

The patient was admitted to the Psychiatric Ward of the Wilhelmina Hospital (Amsterdam), suffering from nervous fears and melancholia. The family physician reported, that the patient during the last weeks was in a state of constant restlessness, and that, although very weak, had tried several times to leave her bed. He wrote that she spoke incoherently and unintelligently and that she was unapproachable. She had constant hallucinations, seeing flames, believing that the people about her were dead and floating in the air. She was in a state of anxiety the whole day and did not sleep. The husband reported that the patient had been ill for four

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weeks. Before marriage she was always bright, but during the pregnancy of the first child she became depressed and tried to commit suicide. After confinement she got better, but occasionally afterwards had a new attack of melancholia, with intervening periods of mania. She had suffered from rheumatism but otherwise had no ailment. An uncle was an idiot; there were no other cases of nervous or mental disease in the family.

On admission to the Hospital the patient was very thin. She was restless and anxious and in constant movement, but did not speak. She gave no answer to the questions put by the doctor and resisted every attempt to touch her. At first there was a slight rise of temperature, but after a few days this fell.

The motility was normal: there were no contractures, tremors or choreic movements. The reflexes were increased, but no other neurological symptoms were found. The patient had optical hallucina-

Figure 1.

Hemorrhage in the cortex.
Weight-Pal Section.)

tions, daily seeing flames; she refused food and had to be fed artificially.

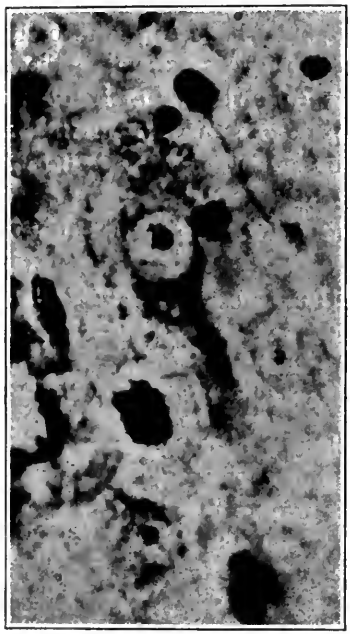
This condition remained stationary for seven days, but then the temperature suddenly rose again. The patient became very ill, was short of breath, moaning a good deal. The general condition was bad, but neurological symptoms were never evident. A rash appeared on her chest and back. No changes were noted in heart and lungs. She got much worse and ten days after admission she died.

The post mortem examination by Dr. Hammer showed the following: There was an extensive thrombosis in the sinus longitudinal superior extending for two-thirds of the length of the sinus forwards. The thrombi were red. There were also many thrombi found in the veins of the pia, which on both sides enter the sinus. The dura mater was adherent. There was edema of the brain surface, but no other alterations, especially no softening.

The following was noticeable in the internal organs. The heart

was slightly atrophied, but not dilated, without any symptoms of inflammation. A slight atrophy of the lungs was found, no tuberculosis, no pneumonia. The spleen was small, flabby and anemic. It was a typical infection spleen. The liver was also small and flabby. A little ulcer with scars was found in the stomach, some diverticula were present in the mesenterium. There were many arteriosclerotic scars in the kidneys, but no nephritis. There was a catarrhal inflammation of the pyelum with many hemorrhagic spots, containing

Figure 2



Pyramid cell of the Gyrus centralis anterior showing the "acute cell disease of Nissl."

purulent fluid and also a catarrhal inflammation of the bladder. There were no other pathological changes in the body.

Dr. Hammer examined the blood; its composition was normal, but many cocci were found, most of these being of chain formation, with four or six links, some of these lying in red or white blood cells.

The pathologic-anatomical diagnosis was: *Thrombosis sinus sagittalis durae matris et venae piae matris.*

Atrophia fusca cordis. Atrophia hepatis et pulmonum.

Lien infectiosus. Pyelitis et cystitis catarrhalis.

Arteriosclerosis renum. Diverticula mesenterialia intestini.

Thus a certain degree of sepsis was found. The post mortem examination revealed no distinct cause of the sinus thrombosis. It may have been the result of the pyelitis, which caused the slight sepsis. As however pyelo-cystitis is repeatedly found in general infections of the body, it may equally well be an accompanying symptom.

When we come to the more minute examination of the brain, no anomalies in the sulci and gyri were discovered. In cutting the cerebrum in a frontal direction, several small pointed hemorrhages were found in the white matter at the convexity of the brain, more especially in the neighbourhood of the thrombosed veins. In some places (*e.g.*, at the right gyrus parietalis) these small dotted hemorrhages had formed themselves into a big brownish-red spot.

Sections were made of several parts of the central nervous system and coloured to various methods. The chief results are as follows:

Microscopical Description

Sections coloured after Weigert-Pal, van Gieson and with hemotoxylin-eosin show, that the blood vessels of the cortex are wholly filled and that many erythrocytes had penetrated through the walls. The hemorrhages are limited to the cortex and the immediately underlying white matter, near to the thrombosed veins; they are missing in the deeper parts (Fig. 1). All the hemorrhages are of very recent date, the blood elements being still unchanged. It seems that the number of vessels is slightly multiplied. The walls of the vessels are unchanged. The pia mater is also hyperemic; in several places large cells with great nuclei, somewhat resembling plasma cells are present, especially along the walls of the blood vessels. They are also found in the pia of the cerebellum. Marchi sections of the gyrus angularis show many black grains in the neighbourhood of the hemorrhages; no secondary degeneration, however, can be observed.

Toluidine sections are made of many places of the cortex and of the deeper regions of the central nervous system. This method also makes it clear, that the hemorrhages are of very recent date. Sometimes quite normal cells may be found in the midst of the hemorrhages. The nerve cells in the direct neighbourhood of these bleedings are not more changed than in the other parts of the cortex.

We shall now give a more detailed description of several parts of the central nervous system.

Gyrus centralis anterior. There are no big hemorrhages. No cell changes are found in the lamina zonalis; a few only in the lamina

granulosa externa. Here and there poorly coloured cells without the normal tigroid are seen. But in the lamina pyramidalis the changes are very distinct: the greater pyramid cells show the "acute cell disease of Nissl" very clearly (Fig. 2). The dendrites are to be traced at a longer distance than is usually the case, the tigroid bodies are only coloured, the nucleus is swollen and often lies against the wall of the cell body. Many of these degenerated cells are surrounded by glia cells, others are very poorly coloured and almost invisible, several being wholly wanting. The glia is increased and is in many places seen in rows along the blood vessels. In the lamina ganglionaris the giant cells of Betz are almost wholly wanting. Wherever seen, they show intensive degeneration. The glia in these deeper layers is not so strongly augmented as in the lamina pyramidalis. In the lamina multiformis only uncertain changes are here and there visible.

Figure 3

Blood Vessel with Ameboid-glia-cells. (Alzheimer Section.)

In the *gyrus frontalis superior* of both sides, the alterations are on the whole still more marked than in the former gyrus. Hemorrhages in the shape of small dots are everywhere found, in the cortex as well as in the underlying white matter. All the vessels are very full, but the walls are normal: there are no perivascular infiltrates. The lamina zonalis shows scarcely anything special, and also in the lamina granularis externa the alterations are still insignificant; in some spots the cells have lost their tigroid. But in the lamina pyramidalis not a single great nerve cell is normal and here also the smaller pyramid cells are altered. Many of the larger cells are almost wholly degenerated and a good many must have disappeared. The most frequent form of degeneration in these pyramid cells is the "acute cell disease of Nissl." There is a distinct increase of neuroglia in these layers. We could not find mitoses in the glia cells. In both the deepest layers, many cells are also altered.

In the *gyrus angularis* there is also a distinct hyperemia without alterations of the walls of the blood vessels. The number of cells suffering from the "acute cell disease of Nissl" is smaller than in the above mentioned gyri. The superficial layers of the cortex are normal, but in the third and fourth layers the "acute cell disease" reappears and several cells are almost wholly degenerated. Only the larger cells are altered and even of these many are unchanged. There is a slight increase of the glia cells. In the deepest layers of the cortex scarcely any changes are visible.

Also in the *gyrus temporalis I* only the large pyramid cells show changes: the glia is here unaltered. In the *gyrus occipitalis I* several degenerated larger cells are found in the third and fourth layer and here and there some of these must have disappeared. In this region of the cortex also no augmentation of the neuroglia is to be noted. In the *regio calcarina* all the smaller cells are very well coloured, but in several places the greater cells show very clearly the "acute cell disease of Nissl," and there is a slight increase of the glia. In the *gyrus supramarginalis* the changes are generally somewhat greater than in the occipital region of the brain. Even in the lamina granularis perfectly evident diseased cells are found near totally healthy ones. The "acute cell disease of Nissl" appears in many of the big pyramid cells of the third layer. In this region also the reaction of the neuroglia is insignificant. In the cortex of the *cornu ammonis* the hyperemia is less clear. The above described typical cell changes are present only in a small number of cells.

What strikes one in the *cerebellum* is the very great changes in the Purkinje cells over the whole cortex. These cells are vaguely coloured, the tigroid bodies are wanting, the nucleus is often swollen. Only here and there a Purkinje cell of the normal colour is found. The other cell forms are normal, except at some places, where there are slight alterations of the greater cells of the zona molecularis. More glia cells than usual are collected around the Purkinje cells. The cells of the nucleus dentatus are normal.

We could not find anything special in the cervical *spinal cord.* The *medulla oblongata* (region of the nuclei hypoglossi and of the olivae inferiores) seems to be undisturbed, except that there is a great quantity of yellow pigment in the cells of the oliva inferior. The hyperemia is insignificant. Also the region of the midbrain scarcely shows hyperemia. In the cells of the nuclei trochlearis the acute cell disease is again found at some places. No cell changes are visible in either the optic thalamus or in the corpus striatum.

Bielschowsky sections, made of several regions of the cortex, where the above mentioned acute cell disease is found, show a distinct alteration. The intracellular network is poorly coloured, in many cases even, no longer visible; the nuclei of the cells are scarcely distinguishable, or have disappeared. The intercellular tissue, on the contrary, is very well impregnated.

We have further examined the condition of the neuroglia in sections, made according to the neuroglia method of Cajal and especially by the different methods of Alzheimer. In many places of the cortex cerebri, we observed a slight enlargement of the neuroglia fibres (Cajal). According to the method of Alzheimer, especially with his methods A and C, ameboid cells are found in several regions. Especially in the gyrus frontalis superior, the gyrus centralis anterior and the gyrus occipitalis I such glia cells were met with. They appear chiefly in the neighbourhood of the small hemorrhages, especially in the perivascular spaces of the small vessels (Fig. 3). However the number of such ameboid glia cells is not so great as we expected to find in delirium acutum.

We also examined more carefully the condition of the *plexus choroideus*, because several authors (von Monakow and others) have observed great changes of this tissue in different cases of psychosis. In our case, the arteries and the veins are overfilled with blood, but the cells of the villi of the plexus choroideus are quite normal. No infiltrates, no symptoms of sclerosis nor other pathological marks could be found. Special sections of several *blood vessels* of the central nervous system (arteria basilaris, etc.) did not show any alterations.

Case II. Historia Morbi of Miss M., aged forty years, unmarried. Profession: matron of an orphanage. The patient was admitted to the psychiatric ward of the Wilhelmina Hospital (Amsterdam), suffering for several months from nervousness. She had been overworked and needed rest. For some time she had been unable to do her work satisfactorily, sleeping badly and complaining of a heavy feeling in the head.

Her past history is as follows. As a child she had had scarlet fever, but was otherwise healthy; as a girl her intellect was good, but she was very nervous. She studied to become a teacher but failed, owing to her nervousness. Five years ago the patient had an attack, similar to the present, from which she quickly recovered.

Her antecedents are as follows: the father died from heart disease, the mother being healthy. Her sister suffered from the same

illness, having had a serious attack of depression and died in the Wilhelmina Hospital. There are no other cases of nervous or mental disease in the family.

At the examination she had a vacant stare, said little, and did not cry. Now and then she asserted that lately God had not been helping her in her work.

Her condition on admittance is as follows. The general physical health is good, she is not anemic. The psychical examination shows that she is cognizant of time, place and persons. It is difficult to draw and keep her attention. Her temperament is depressed. There are no hallucinations. She pays little attention to her surroundings and is inactive. She is not cataleptic, there is no mutism or negativism.

As regards the intellect there are no disturbances. Her memory is very good. Her school knowledge is better than she imagines. Her judgment and power of criticism are normal.

The neurological examination shows no defect. The speech is good. The motility and sensibility are normal. There is only a slight trembling of the fingers. The reflexes of the extremities and of the abdomen, as also the reaction of the pupils, are normal. There is nothing abnormal in the heart and lungs. The Wassermann reaction in the blood is negative.

The patient remained in the same condition for a fortnight, being depressed and anxious, and not showing other symptoms. Then a fairly sudden change occurred, symptoms of fear increased, she became restless, frequently left her bed and made constant movements, repeatedly blowing her mouth. Yet she was aware of her surroundings. The patient perspired freely yet there was no fever and the pulse was normal. Hot baths and medicine lessened the feeling of anxiety, but the general condition became less satisfactory. The twentieth day ofter admission the temperature rose to 41.5° C., the pulse 100, the following days the temperature remained equally high. Nothing special was found in the heart, lungs and abdomen. The reflexes showed no alteration. The diazo reaction was negative. The facial expression showed signs of anxiety. She constantly muttered unintelligibly and did not answer when questioned. She did not do what was asked and forcibly resisted being examined. She was in constant movement. A rash appeared all over the body. On the following days the temperature remained above 40° C., the psychical condition was stationary, but the patient got worse, and, a week after the temperature increased, the patient died.

The post mortem examination showed the following results:

A quantity of blood was found on the surface of the left hemisphere of the brain. The left sinus petrosus inferior and transversus were almost completely obliterated by large thrombi. The left temporal and occipital lobe showed a softening with tiny blood spots surrounding it. No pathological changes were found at the base of the brain or on the bones of the skull and the organs of hearing were normal. The brain weighed 1245 grams. There was nothing special in the formation of the sulci and gyri. The examination of the internal organs had the following results. There was a slight brown atrophy of the heart, but no dilatation and no endocarditis. The aorta manifested scleroses of a small degree. A tablespoonful of clear yellowish fluid was found in the pericardium. The examination of the lungs showed no signs of tuberculosis or pneumonia. The liver was somewhat atrophied. Further there was an infection spleen. There were some adhesions in the peritoneum. The other organs showed no pathological alterations.

The pathologic-anatomical diagnosis was: *Thrombosis sinus transversi et petrosi inferioris sinistri. Encephalomalacia rubra lobi temporalis et occipitalis sinistri. Atrophia fusca cordis et hepatis. Lien infectiosus atrophicus. Arteriosclerosis aortae.*

The post mortem examination did not give a definite explanation of the cause of the thrombosis.

There is much blood upon the left hemisphere, partly also subpial, extending from the frontal lobes to the occipital pole. A part of the left temporal gyrus is wholly destroyed and softened. Also at the base of the brain a bloody infiltration is visible. The right hemisphere is free from thrombi and blood.

In cutting the brain in a frontal direction it is clear, that the softening is limited to the cortex of the left temporal lobe and that the deeper lying parts of the central nervous system are free. The cornu ammonis and the gyrus fusiformis, for example, are not destroyed.

Microscopic Investigation

Weigert-Pal and van Gieson sections show that the softening of the left temporal lobe must be of very recent date. There are many small hemorrhages in the neighbourhood of the softening spot. Also in the pia mater of this region fresh hemorrhages are visible. No secondary degeneration in the direction of the optic thalamus, either with the Weigert-Pal, or with Marchi method is visible.

With the latter many black grains are found in several parts of the cortex cerebri. In the toluidine sections the following facts are noted. In the *gyrus centralis anterior* the pia mater is slightly swollen. The blood vessels are all filled up with blood. Between the meshes we see again these peculiar big cells—also mentioned in our first case—which resemble plasma cells and sometimes mononuclear leucocytes. In the cortex itself there is also hyperemia, but

Fig. 4. Chronically altered pyramid cells of the gyrus centralis anterior.

there are no hemorrhages. The lamina zonalis is normal, and the cells of the lamina granularis externa show only little changes. But in the next layer many diseased pyramid cells are found. They are poorly or faintly coloured, the nuclei are swollen and degenerated, the tigroid bodies are not quite visible. In many cells the nuclei are wanting. In the deeper layers of the cortex the same is the case, and it is remarkable that the giant cells of Betz are almost totally absent. Only in some places there is found a degenerated re-

mainder of these cells. Many cells of this gyrus show the "acute cell disease of Nissl" but there is also another type of degeneration visible. Several cells are very long and small, the dendrites are visible far off, thin and extended. These cells are very darkly and diffusely coloured, with a nucleus scarcely visible or wholly wanting (Fig. 4). They are not infrequently met with in groups, sometimes in the immediate neighbourhood of cells suffering from the acute cell disease (Fig. 5). They resemble cell alterations, found in cases of several chronic psychoses (dementia praecox) and have a distinct character. In the lowest layers of this gyrus scarcely any alterations can be found.

Generally speaking, the reaction of the neuroglia is very moderate; many of the larger ganglia cells have a number of "traban-cells" at their base (Fig. 6), but only in some places a slight increase of the number of glia cells can be seen. There are no mitoses.

In the *gyrus frontalis superior* many small hemorrhages besides the hyperemia are present. The alterations in the nerve cells are still more pronounced than in the gyrus centralis anterior. In the lamina pyramidalis a normal cell is scarcely found and also the smaller cells are degenerated. Most of these show the "acute cell disease of Nissl" (Fig. 7). But in several spots also the above mentioned cell degeneration of more chronic character is seen. Very likely many cells have wholly disappeared. Also in the deeper layers of this gyrus diseased cells are visible. There is a clear increase of the number of glia cells in the lamina pyramidalis.

In the *gyrus frontalis medius* and *inferior* of both sides there are also intensive alterations in the nerve cells, but only those of an acute character.

Many parts of the *gyrus temporalis* I of the left side have been so destroyed by the hemorrhages, that it is not possible to judge the condition of the cells. Where there are no hemorrhages, the alterations are still very intensive, although the hyperemia is sometimes insignificant. The cells of the lamina zonalis appear to be normal, but in the lamina granularis externa a number of small cells is distinctly suffering from acute cell disease. In the third and fourth layers nearly all the cells are degenerated. In several places the chronic form of degeneration is seen. In the deepest layers the acute cell disease is much less frequent. The alteration of the glia is less marked than, for example, in the gyrus frontalis superior.

In the right *gyrus temporalis* I, where there is no big thrombus, the changes in the cells are much slighter. Only the larger pyramid

cells manifest the acute cell disease; here and there the changes of more chronic character are scarcely found. The neuroglia is not increased to any extent.

In the *gyrus temporalis medius,* of the same side, the number of diseased cells is much greater. There are no "chronically" altered cells; they are found, however, in the third temporal gyrus, which is otherwise in the same condition as the second temporal gyrus.

In the *regio occipitalis* of both sides it is remarkable that the sections of the regio calcarina show much slighter disorders in the

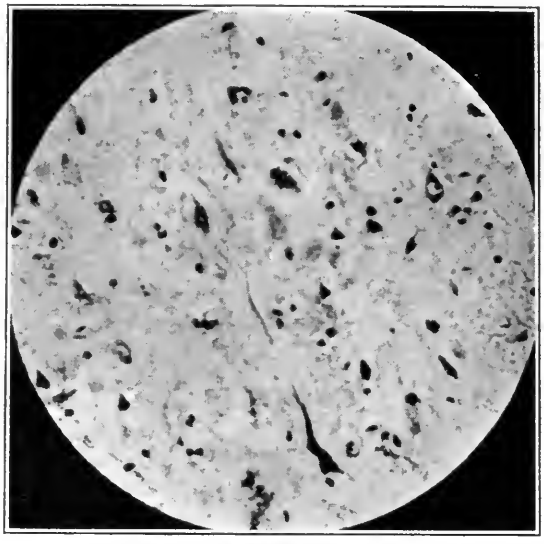


Fig. 5. Cells with acute and with chronic gyrus degeneration. (Centralis anterior.)

nerve cells than in the gyrus occipitalis I. In the former only the larger cells in the third layer are degenerated, in the latter many small cells as well as the greater are affected. But nowhere in the occipital lobe are alterations of the above described chronic character visible, and the neuroglia is almost normal in this part of the cortex.

Small groups of these chronically altered cells are met again in the *gyrus fusiformis* I, and the *cornu ammonis,* in which also several greater cells show the typical acute degeneration.

In the cortex of the *cerebellum* the same condition is found as in our former case. Many of the Purkinje cells are degenerated, and

the glia around these cells is increased. The other cells of the cerebellum are quite normal.

In the *medulla oblongata* many cells of the oliva inferior contain yellow pigment; it is doubtful whether this is abnormal. In the other parts, however, many larger cells show the acute degeneration, for example the large cells of the nuclei reticularis, of the nucleus hypoglossi, etc. Here and there, also, cells with more chronic degeneration are visible. In the *midbrain,* the *optic thalamus* and the *corpus striatum* cell degenerations are also clearly seen; the glia is only increased in the optic thalamus.

Bielschowsky sections show the same characteristics as in the

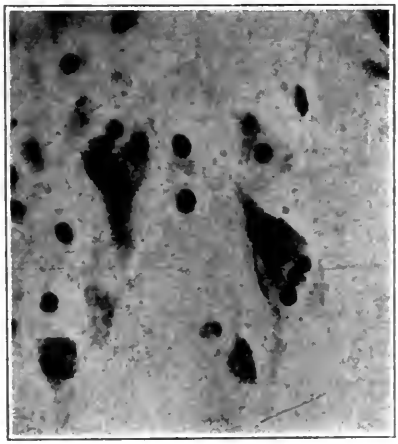


Fig. 6. Degenerated Cells with trabant cells.

first case, but to a greater degree. The intracellular network has disappeared in the acute diseased cells. In the cells with the degeneration of a more chronic character on the contrary, this network is coloured very dark.

In studying the sections, made after the neuroglia method of Cajal, it seems that there is a slight increase of the glia fibres in several places of the cortex cerebri, but mostly there is no distinct difference from normal sections. Contrary to the first case, no ameboid glia is found by the Alzheimer methods.

Toluidine sections of the *plexus choroideus* show hyperemia; all the blood vessels are over full. At some places small hemorrhages are present. The cells of the epithelium, however, still remain unaltered. The walls of the *blood vessels* do not show anything ab-

normal in the whole central nervous system. There are no perivascular infiltrates found in the nerve tissue.

Briefly to sum up the chief points, in the two cases of delirium acutum in patients suffering from manic-depressive psychosis, we found extensive primary thrombosis of the brain sinus with hemorrhages in the cortex. The microscopic investigation of the brain showed besides, in many places, great changes in the nerve cells. In the first case only the "acute cell disease of Nissl" is found, several cells having also wholly disappeared; in the second case degenerations of a more chronic character were also visible. In connection with the examination of the internal organs we must conclude that

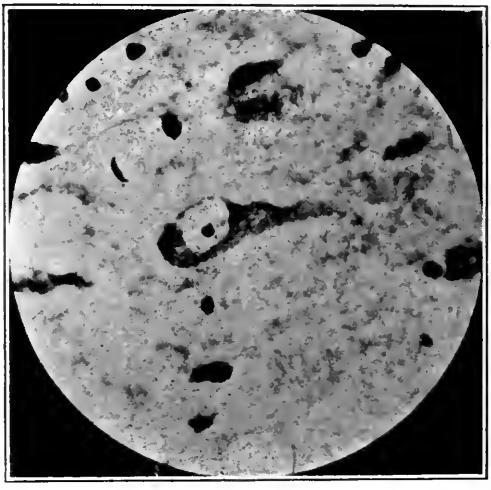


Fig. 7. Cell with acute cell disease of Nissl. (Gyrus frontalis superior.)

a severe acute infection had been at work. The origin of this infection could not be sufficiently determined.

The question now arises, what was the connection between the delirium acutum and the primary sinus thrombosis? Has the latter caused the former? Such a sinus thrombosis is very rarely found in typical cases of delirium acutum. A case somewhat resembling ours is described by Schröder (1909). After childbirth a woman showed catatonic and deliriant symptoms. In the post mortem examination an extensive sinus thrombosis was found in the brain, and many cells of the cortex showed the acute cell disease of Nissl.

It is known that the primary sinus thrombosis shows clinically many variations and not infrequently this is found in the post mortem examination without there having been any symptoms during life. Von Monakow, who has given a fine description of this subject in his *Gehirnpathologie* mentions, that in severe cases disturbances of the consciousness, delirium and several symptoms of irritation of the central nervous system (convulsions, etc.) are seen. Not unfrequently the clinical image resembles acute meningitis (Voss). In the newer literature we have not been able to find any fresh point of view on the clinical side of this subject. A summary of the more recent bibliography has been collected by Lewandowsky. It is clear that the difficulties are at present also very great in making a correct clinical diagnosis. Remarkable in this connection is an observation by Riggs, who had a patient operated upon for tumor cerebri; the post mortem examination showed that there was only an extensive primary sinus thrombosis.

Primary or autochthonous sinus thrombosis does not occur so frequently as the purulent type, which, as is well known, is mostly caused by inflammation of the auditory organs. The former, however, springs from quite different causes, namely in many diseases accompanied by severe marasmus. The primary sinus thrombosis is seen in cases of tuberculosis pulmonum, nephritis, heart disease, enteritis (especially in children), typhus, pneumonia, cancer, influenza, appendicitis, malaria, several diseases of the blood. We have personally seen such a thrombosis in a patient suffering from severe chlorosis with serious psychical disturbances, in meningitis tuberculosa and in dementia paralytica. As a great exception Reinhold has described this affection in chorea minor.

Opinions differ as to the cause of the sinus thrombosis, just as in the other thromboses of the body. Various investigators attach great significance to the fact, that the blood flows more slowly in the sinus of the brain, but it is certain that this cannot be the real cause. The majority of authors ascribe the cause to infection, which damages the endothelial cells of the walls of the sinus, through which small thrombi arise. Katzenstein has studied this in detail and has detected in several cases microorganisms which had caused the infection. Although infection may be the most frequent cause of the sinus thrombosis, yet it does not seem absolutely necessary always to accept this. In blood diseases and in marantic conditions it is probable that the vasa vasorum of the sinus are underfed, hence leading the degeneration of the endothelial cells.

It sometimes occurs that none of the above mentioned affections are in evidence. The most thorough examination of such cases has been made by Therman. He found by the microscopic investigation of the brain extensive and intensive changes of the nerve cells in the cortex and concluded that there was always in these brains a meningo-encephalitis. He believes that the sinus thrombosis was not the origin, but the consequence of this encephalitis.

Our idea about the cases we have examined, is that the delirium acutum is not caused by the primary sinus thrombosis, but that both affections are the result of one cause. The results of the histological investigation contradict the conclusion, that the delirium acutum was the clinical expresson of the sinus thrombosis. Then in both cases we found hemorrhages that must have been quite recent, because the red blood corpuscles were not altered. This was also in the thrombosed veins. We saw further intensive degeneration of nerve cells in several parts of the central nervous system, with no thrombosis. This alteration of the ganglia cells had in many respects the same character as is found in cases of delirium acutum without sinus thrombosis, as will be described in the next pages. We believe that the body has been infected, with the result that the central nervous system has also suffered. In the last days before death the endothelium of the sinus has also been injured, by which thrombus was created. It is probable that this has been favoured by the marasmus and by the hyperemia in the brain. The sinus thrombosis in this case is accidental: it has perhaps hastened death, but has no further value for the analysis of the pathological anatomy of delirium acutum.

In reviewing briefly the literature on the subject of the delirium acutum, we would state that this syndrome may occur in the course of different psychoses (in manic-depressive psychosis, exhaustion-psychosis, infection- and intoxication-psychosis, collapse, delirium, dementia paralytica, etc.). Many investigators believe that we must regard this delirium acutum as the result of meningo-encephalitis acuta. The appearance of hyperemia, hemorrhages, degenerations of the nerve cells and perivascular infiltrates has led them to this conclusion (Binswanger and Berger, Kozowsky and others). This encephalitis should, in that case, be of toxic origin, all the more because repeatedly microbes are found (Bianchi and Piccinio, Resonico, Mills, Potts and Burlett, Hunt, Pötzl and Wells). Yet one is struck by the fact, that the real symptoms of inflammation in the brain are often missing. Hence many workers avoid the word encephalitis (Alzheimer, Hanes). Another striking fact is that the

anatomical results vary much, especially when the condition of the neuroglia is taken into account. There are cases where increase of neuroglia is very marked; there are others where this is insignificant (Alzheimer) Gruhle and Ranke). The most typical alteration found in recent times is the acute cell disease of Nissl. It has also been found in our cases. In both the acute cell disease of Nissl dominated, but in the second case we found also alterations of the nerve cells of a more chronic character, as is seen, for example, in dementia praecox. This leads us to believe that some other disease had formerly affected the brain. It is generally accepted that besides the exogenetic cause there is also an important endogenetic source in most cases of delirium. In our second case this was very clear; not only did the chronically degenerated cells prove that the central nervous system had been previously weakened, but there has also been a family predisposition. A sister of this patient also died in our clinic of delirium acutum several years before.

It does not seem correct to regard our case as encephalitis, because the true symptoms of inflammation (especially perivascular infiltrates) were not present in the nerve tissues. The presence of the above described cells in the pia mater is not sufficient for the diagnosis of encephalitis. To explain the origin of the degeneration of the nerve cells we will not infer more than the following. A disturbance in the metabolism of the organism—more especially in the brain—had been caused by fever, acceleration of the blood circulation, toxins, etc. The feeding of the nerve cells was not thus so perfect. The degeneration in these cells must therefore be regarded as a disturbance in the assimilation and dissimilation of the cell body.

In the pathological anatomical investigation two points have claimed our attention. In the first place, the fact that, in both cases, the frontal area of the brain has suffered most, and, secondly, that amongst all the cells of the central nervous system, the bigger ones were most affected.

In our second case, very intensive degeneration is also found in the left temporal lobe, but only in these regions where there is softening. The lesion of the frontal brain, being otherwise greatest, is perfectly clear. To explain this fact it needs to be borne in mind that the frontal area of the brain is inclined to be affected by various diseases. This is very apparent in dementia paralytica, also in arteriosclerosis, and in different kinds of encephalitis. This tendency

cannot be accounted for by being an affection in a special area of the brain, which is fed by one large blood vessel. The origin must be deeper. We believe that this fact, that the frontal area of the brain suffers so much in different diseases, is owing to its being a part of the cortex phylogenetically very young. We know that the parts of the central nervous system which belong to the younger areas have less power of resistance against damaging influences. Probably the physical chemical constitution of these regions is different from other parts.

As stated above the bigger ganglia cells undoubtedly suffer more than the smaller ones. This is not only true in the pallium, but also in the cerebellum and, in our second case, also in the lower parts of the central nervous system. In the pallium this is most evident in the areas where the acute cell disease was least severe, for example, in the regio calcarina. In this region it is very clear that only the larger cells were suffering. But also in the frontal brain, where the alterations are visible in the larger and in the smaller cells, it is not to be denied that the larger ones have suffered most.

This fact is occasionally met in delirium acutum (see the description by Cramer, Binswanger and Berger). It is, however, not always the case, as it is not to be wondered at, seeing that the delirium acutum is so often met with in other diseases, where the brain has already been damaged.

To explain this one could argue that the alterations in the greater elements are easier seen than in the smaller. That is true, but in areas where the disease is very intensive, the changes can also be seen very clearly in the smaller cells. If we now inquire whether analogies of this feature are to be found in other diseases of the nervous system, the answer must be in the affirmative. This is very evident in cases of parenchymatous degeneration of the cerebellar cortex. In most of these it is striking that the Purkinje cells suffer first and most intensively. These great cells, indeed, degenerate in many different diseases of the central nervous system, and hence Abrikosoff concludes that these ganglia cells are the most vulnerable in the whole nervous system. The same feature is seen in acute poliomyelitis. Anatomical investigation shows that in the first days of the disease there is a meningo-myelitis, with a preference for grey matter. In such acute cases, affections of the blood vessels and infiltrates are seen throughout the whole of the grey matter (also in the white). But when the disease is more advanced, the remaining defect is limited to the anterior horn, where many

great cells have disappeared. The smaller cells in the posterior horn remain undisturbed. In the rare cases where a defect remains also in the posterior horns, it is then the greater cells of Clarke's column that are changed.

The same applies to many other diseases of the spinal cord, for example, the spinal form of progressive nuclear atrophy, poliomyelitis anterior chronica, amyotonia congenita of Oppenheim, the disease of Werdnig-Hoffmann. We can also give an example of a disease of the medulla oblongata. In the chronic progressive bulbar palsies, all the greater cells gradually disappear, while the small ones remain intact. Finally, we know that in the cortex the giant cells of Betz disappear early in different diseases.

In short, there are many examples from which it appears that the greater cells are inclined to suffer more easily. Hence the question arises—also in connection with the results of our own investigations—whether the circumstances that the cell is large is not the cause of a greater vulnerability. We have already pointed out that the degeneration of the cells in our cases of delirium acutum is finally caused by disturbances in the metabolism. We are therefore led to inquire whether, perhaps, the process of metabolism is more difficult in these greater cells. In this connection we shall make use of the views of several biologists (Bolk and others). Namely, the fact, that in the phylogenesis the greater cells are inclined to disappear, is accounted for by the metabolism being more difficult. Such large cells as are found in the spinal cord and in the medulla oblongata of the lower animals, are not present in higher vertebrates. When the size of a cell increases, its surface is raised to the second power, but its contents to the third. The surface increases relatively less quickly than the contents. The consequence of this is, that the assimilation and the dissimilation are more difficult in the greater cells, because these processes act on the surface. Hence a cell that functions very intensively must be small.

Such an idea is attractive to an anatomist of the brain, because he knows that these parts of the central nervous system, that act very intensively and almost without stopping, mostly consist of smaller cells (sympathetic vagus cells, for example). It may therefore be accepted that the greater cells in which *à priori* the metabolism acts less easily, are the first to suffer, when there are disturbances of this process in the central nervous system. The relative smallness of the surface of the cell is here the chief thing.

RESUMÉ

In this article two cases of delirium acutum have been described, occurring in patients suffering from "manic-depressive psychosis." In the post mortem examination a primary sinus thrombosis was found. The microscopical examination of the brain showed, firstly, that these thromboses were of recent date, having originated some days before death. It was not the cause of the delirium acutum, but both affections were the consequence of a general infection of the body. In both cases there were extensive degenerations in the nerve cells, mostly belonging to the type of the acute cell disease of Nissl. In the second case, changes of a more chronic character were also found Although there were differences in the histological details both cases agree in two points. Firstly, the lesion was most severe in the frontal area of the brain. This is explained by the circumstances that this part of the brain is the youngest in phylogenesis, and has, therefore, less power of resistance against noxious agents. Secondly, the greater cells showed more inclination to suffer than the smaller ones, as is the case in many other diseases of the central nervous system. This fact is explained by the circumstance, that in the greater cells the surface is relatively smaller, whence the processes of assimilation and dissimilation are more difficult. When disturbances in the metabolism of the central nervous system occur, these will first manifest themselves in the larger cells.

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PACHYMENINGITIS CERVICALIS (LUETICA) WITH UNUSUAL FEATURES*

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A. H., 44 years old, white, a native of Austria, was admitted to the neurological service of the Mt. Sinai Hospital on August 11, 1920, complaining of pain and weakness of both upper extremities, inability to use his arms, poor vision, especially in the left eye, tremor of the hands, frequent headaches and diminished sexual power.

His *family history* is of no significance.

His *previous history* except for an attack of gonorrhoea at 28 is negative.

Personal History.—Married at 38; his wife gave normal birth to three normal children, all of whom are alive and well. No miscarriages. Syphilis denied by name and symptom.

His *habits* are good. He never smoked or drank to excess.

Present Illness.—About 10 years ago he began to have gastric disturbances, the exact nature of which cannot be determined; these ceased completely three years ago. Five years ago he began to have a "gnawing" pain and weakness in the right shoulder and arm. The pain was very severe and always worse at night; it lasted one year. The weakness was progressive and greatest on raising the arm. He also noticed that his shoulders and upper part of the arm began to grow thinner, the maximum thinness being reached at the end of two years. Eighteen months ago he began to have similar pains and weakness in the left shoulder and arm, which are also becoming progressively thinner, and at the time of admission the pain in them still persists.

The patient states that during the last three years he has on numerous occasions seen "double," and that during the last year his eyesight has not been as good as before, especially in the left eye. For the last three years his sexual power has not been as good

* From the Neurological Service of the Mt. Sinai Hospital, New York city. Presented at a clinical conference, Nov. 3, 1920.

as before. He frequently has headaches. These have no special localization and are not influenced by anything. Recently he has greatly been annoyed by a tremor in both hands. He occasionally has difficulty in controlling his bladder and rectum.

Examination reveals a poorly nourished individual with no evidences of cardio vascular, renal or respiratory disease. There are no petechiae and no icterus. When he extends his arms a fine tremor is noticeable in the hands and fingers. This is probably due to muscular weakness. Fibrillary twitchings are noticeable in whatever musculature is left of his deltoids, pectorals, trapezii, and spinati. The myotatic irritability of the muscles of the shoulder girdle and arms is somewhat increased.

His mentality is apparently unimpaired. There is no aphasia and no dysarthria.

His visual acuity roughly tested shows no gross defects. There is no hemianopsia. No tests were made for color fields.

Ophthalmoscopic examination by Dr. Wolf: Left eye: Large areas of medullated nerve fibers. Right eye: Small areas of medullated nerve fibers upward and nasally; otherwise fundi are normal. *Pupils.*—Both are small, miotic and irregular in outline but equal in size; the left is fixed to light; the right reacts slightly and sluggishly to light. Both react promptly to accommodation. There are occasional nystagmoid movements in both eyes, in the extreme horizontal position. No paralysis of convergence. No external ocular palsies.

The right naso-labial fold is not as marked as the left one. There are no evidences of involvement of the remaining cranial nerves.

Sensation.—Objectively there are no disturbances of superficial or deep sensibility, and no astereognosis. Subjectively he complains of sharp pains in the arms, and of headache.

Motor Functions.—Deltoids weak, left more than right. Pectorals weak, right more than left. Rhomboidei completely atrophied. The strength of the levator anguli scapulae cannot be determined. Trapezii both weak. Sterno-cleido mastoids are apparently normal. Subclavius cannot be tested. Supra and infraspinatus wasted on both sides. Subscapularis, wasting cannot be determined. Latissimus dorsi, weak on both sides. Teres major, weakness cannot be determined. Serratus magnus, right atrophied, left not involved. Triceps, wasted on both sides. Biceps and coraco-brachialis, wasted on both sides. Supinator longus,

both wasted. Extensors of the wrist and fingers, weak on both sides. Pronators, not involved. Flexors of wrist and fingers, apparently not involved. Thenar, hypothenar, interossei and lumbricales not affected on either side. Both hand grips are weak.

The motor functions of the remaining musculature are apparently normal. General myotatic irritability somewhat increased.

F to N test poorly carried out, but this is due to the great muscular weakness in the arms. No ataxia. No cerebellar symptoms. Station and gait normal. No Romberg.

Reflexes: Superficial.—Corneals: present.

Palatal: present.

Abdominals: all but the lower right are markedly diminished.

Bulbo-cavernosus: present.

Cremasterics: lively and equal.

No Babinski or any of its confirmatories.

Deep.—Jaw jerk: lively.

Pectorals, biceps, triceps, and radial—very lively on the left side and present, but diminished, on the right.

KJ's: extremely lively on both sides.

AJ's: lively; right greater than left. Occasionally ankle clonus can be elicited on the right side.—No Kernig.

Sphincters: Patient states that he has some difficulty in starting urination.

Laboratory Findings.—

Blood Wassermann on two occasions suspicious (Mt. Sinai serological laboratory). Cerebro-spinal fiuid: 0.1 to 1 c.c. Wassermann, 4 plus. Globulin, one plus. Five lymphocytes to the cubic millimeter. Fluid obtained under normal pressure.

Urine.—Normal.

Temperature.—Normal.

Blood Pressure.—No difference on the two sides: 105/72.

Electrical Reactions.—Dr. Harris reports: Faradic response in the shoulder girdle muscles and the arm of the left side is prompt but a stronger current is required. Galvanic response in the right shoulder girdle muscles is normal, while on the left side the response is prompt, but the ACC is greater than the KCC.

There is no tenderness on percussion of the skull, spine or any other part of the osseous system.

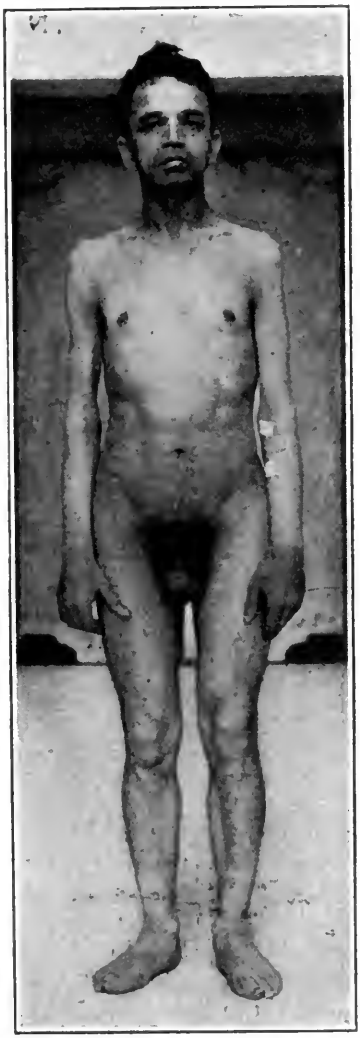
X-ray examination of skull, cervical and dorsal spinal column is negative.

There are no vasomotor or trophic disturbances.

Bedside Notes.—

Aug. 15, 1920, received intravenously arsenobenzol .4 gm.

Aug. 21, 1920, received intramuscularly Hg. salicylate gr. .1.



Note the wasting of the muscles of the shoulder girdle and both arms in contrast to the well preserved musculature of the rest of the body.

Aug. 25, 1920, received arsenobenzol intravenously .4 gm.

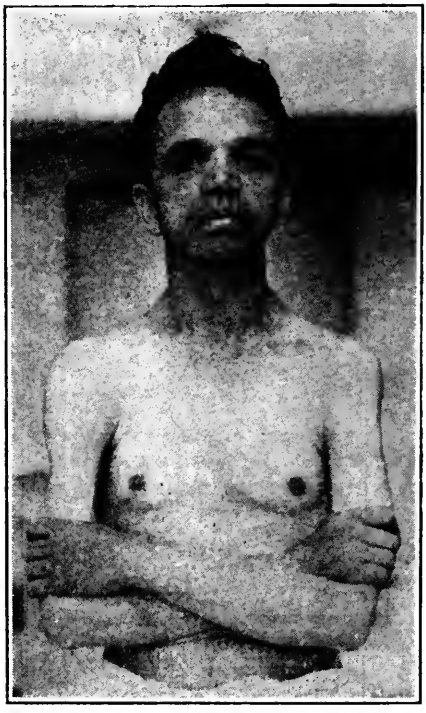
Aug. 29, 1920, received intramuscularly Hg. salicylate gr. .1.

Aug. 30, 1920, discharged from the hospital with the following

note: Pains almost entirely disappeared. Beginning increase in power. Transferred to the dispensary for further anti-specific treatment.

Sept. 9, 1920, blood Wassermann in the dispensary negative.

The case may then be summarized as follows: A 44-year-old man began to have some vague gastric disturbances 10 years ago, which lasted until 3 years ago. Then he began to have "gnawing" pains and weakness in the right upper extremity (5 yrs. ago).



Note the atrophy of both shoulder girdles, and the muscles of both arms.

This lasted one year. He then began to have similar pains and weakness in the left upper extremity (18 months ago) which persisted up to the time of admission to the hospital. During the last year his vision (in the left eye) has not been as good as previously. For the last 3 years he has frequently had generalized headaches. His sexual power has been poor during the same period. Some years ago he had frequent urination for one week. His pains are always worse at night. Owing to his muscular weakness he has lately been incapacitated for work.

He presents the following positive objective findings: Pupillary changes, slight nystagmoid movements in both eyes; some facial weakness on the right side; atrophy of the trapezii (slight); marked atrophy of the supraspinati, deltoids, biceps, triceps and supinators, especially the left, with weakness of all movements controlled by these muscles; fibrillary twitchings in the muscles of the shoulder girdle, and partial R.D. in the involved muscles; some sphincteric disturbances; increased tendon reflexes in the lower extremities, with an occasional clonus in the right ankle; a 4 plus Wassermann and an increased globulin content of the spinal fluid.

On this history and findings the diagnosis of cerebro-spinal lues and pachymeningitis cervicalis was established.

In making this diagnosis the following conditions have to be excluded:

1. Amyotrophic lateral sclerosis. Pain in the arms, which is so marked a feature in our patient, is not a symptom of amyotrophic lateral sclerosis. The absence of a spasticity or rigidity in the involved extremities, as well as the absence of bulbar symptoms after five years' duration also speak against such a diagnosis.

2. Spinal tumor. This can be excluded on the grounds that the patient shows evidences of cerebro-spinal lues, that there is no sensory level and no objective sensory disturbances. The duration of the disease, the absence of signs indicating increasing cord compression are all against such a diagnosis. As a general proposition, we may also add that the pain in spinal tumors is much more lancinating in character than in our case.

The same diagnostic criteria are also applicable in the exclusion of circumscribed serous meningitis and circumscribed meningeal cysts.

3. Syringomyelia. Against this diagnosis are, absence of spinal deformity, absence of sensory dissociation, absence of vasomotor phenomena and of trophic disturbances of the skin, bones and joints; absence of oculo-pupillary symptoms, and the absence of a spastic paralysis of the lower extremities, and the fact that the muscular atrophy did not begin in the small muscles of the hands, as is usually the case in the Aran-Duchenne type of progressive muscular atrophy (commonly seen in syringomyelia of the cervical cord.)

4. Multiple neuritis. The absence of any of the usual etiological factors of multiple neuritis, the absence of objective sensory changes

and of nerve tenderness, and the increased deep reflexes in the lower extremities, are sufficient to exclude this condition.

5. Chronic disease of the anterior horns of the cord, such as chronic anterior poliomyelitis, and chronic progressive muscular atrophy are excluded by the absence of pains in the latter, and the presence of exaggerated deep reflexes in the lower extremities in our patient, as well as by the presence of ocular symptoms.

6. Tuberculous pachymeningitis. This condition may present a clinical picture not unlike that seen in our patient. The absence of evidences of tuberculous disease in the vertebral column and in other parts of the body, and the presence of evidences of syphilis, are sufficient to make the differentiation.

7. Muscular dystrophy. In this condition there are no pains and no fibrillary twitchings, no R.D. and no increased deep reflexes, and no cranial nerve involvement.

8. Brachial paralysis from cervical ribs. Radiography of the spine failed to show the presence of any supernumerary cervical rib, nor were there any evidences of inequality of the radial pulses such as are commonly found in this condition.

Note.—Examination in the dispensary on January 27, 1921, after he has received three courses of intensive salvarsan and mercury treatments, show no new neurologic findings. Subjectively he feels much better. He has been free from pain for the last four months. The disease has apparently been arrested. At this writing he is still receiving antiluetic treatment.

We may therefore conclude that this case is one of cerebrospinal lues, the prominent features of which are a meningomyelitis involving C5, C7 and C8 segments of the cord, with participation of the anterior and posterior roots as well as the anterior horns at the same levels. The exaggerated knee jerks with tendency to ankle clonus on the right side seem to point some involvement of the pyramidal tracts.

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Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

The Three Hundred and Ninety-third Regular Meeting
Held at the Academy of Medicine, January 3, 1922
The President, Dr. Foster Kennedy, Presided

CHEMISTRY OF PHOSPHORUS IN BRAIN ACTIVITY

[Author's Abstract]

Dr. William H. Porter. Phosphorus in combination with soda serves the physiological economy in three distinct processes: (1) In connection with the digestive functions the trisodic phosphate is acted upon by the hydrochloric acid and converted into (2) a disodic monohydrogen phosphate which is the true alkalinizer of the body fluids and tissues. A high state of alkalinity is essential to perfect oxidation and assimilation. (3) After the disodic monohydrogen phosphate has served its purpose in the body it is excreted through the kidneys, where it meets a molecule of uric acid and is transformed into the acid monosodic dihydrogen phosphate, the true acidifier of the urine.

Phosphorus is found also in combination with calcium, magnesium and potassium, the sodium and calcium combinations being most important. Phosphorus also reaches the body fluids and tissues in the form of lecithin, nucleoalbumin, nucleic acid, phytine, etc. Phosphorus enters plant life as a phosphate to be synthesized into these highly complex bodies.

The author's contention for years has been that oxidation reduction takes place only in the fixed cells, as found in the various body glands, and not in the body tissues and fluids; and that this process constitutes, in a large measure, the biologic activity of the body cells. In connection with these oxidation reduction processes and the exact place where they occur, it should be remembered that the ganglion cells of the nervous system are large masses of protoplasm resembling in composition, but not in shape, the cellular structures of the glandular organs, and that, in all probability, they are the place at which the complex phosphorus-bearing bodies are oxidized and reduced.

The reasons for this interpretation are that these protoplasmic masses are very abundant in the central nervous system; that these phosphorus-bearing compounds are found in larger amount at this point than in any other parts of the body, and that there seems to be a decided generation of impulses originating in the central nervous system which control and regulate the automatic balance of the human

system,—a condition which could not be maintained if the nervous energy was due solely to reflected heat energy brought to the central nervous system by the centripetal nerves and reflected out again by the centrifugal nerves. Active working of the central nervous system is always accompanied by increased elimination of alkaline phosphates, which fact tends to support the theory that these phosphorus-bearing bodies are oxidatively reduced in the cells of the central nervous system. Hence, increased elimination of the alkaline phosphates indicates simple augmented physiological activity of the nervous system; and overelimination of the earthy phosphates in a highly acid urine indicates a malnutrition involving chiefly the nervous mechanism.

The answer to the question as to how these complex phosphorus-bearing bodies can be converted into energy and phosphates, and how they pass out of the system, is plain if the theory be accepted that the protoplasmic masses of the central nervous system have the power oxidatively to reduce this class of bodies. Assuming that the nerve cells possess this power, lecithin, for instance, is here reduced to phosphate of soda, urea, carbon dioxid and water.

It is recognized that bone deficiency is not due to lack of lime salts or bone-producing elements, but to disturbance of metabolism which prevents fixation of the calcium salts. In the reduction of the phosphorus-bearing molecule it is reasonable to suppose that, for an instant, the phosphorus atom is free and exerts this oxidative stimulating action upon the protoplasmic masses, thus generating an inherent central nervous impulse, which not only augments the cell activity *per se* in which this change occurs, but is reflected to all parts of the economy by the nerve fibers springing from the cells.

So far as known to the author, the production of disodic monohydrogen phosphate from these complex phosphorus-bearing compounds is a newly revealed fact, and gives to the physiological economy an inherent source of this absolutely essential body alkalinizer. How much is produced in this manner daily is not known.

A CASE WITH THE CLINICAL PICTURE OF MIDDLE FOSSA TUMOR: AUTOPSY FINDINGS

[Author's Abstract]

Dr. E. D. Friedman. John C., 11 years old. Admitted November 13, 1921, to Bellevue Hospital; died December 11, 1921. Italian. Family history negative. Previous history: Normal delivery and development. Present illness: Began five to six months ago with attacks of headache lasting about one day and recurring once a week. His condition remained unchanged for three and a half months. He then became bedridden, being unable to walk. Three weeks prior to his admission to the hospital he became drowsy and had nose bleed; the right eye became bloodshot. Weakness of the right side of the face developed. There was no fever at any time. Three weeks ago, at the onset of one of his attacks, he was uncon-

scious for a short time. His headache became constant but there were no bladder or rectal symptoms. He had complained of pain in the right side of the face and of double vision. The physical examination showed an emaciated, pale boy, with a dry skin. He was irritable and coöperated poorly in the examination. The physical examination showed no abnormal medical findings. The right pupil could not be examined, due to local conditions in the eye, the cornea being cloudy; the conjunctiva was hyperemic. The left pupil was large and reacted poorly to light and accommodation. There were ptosis of the right upper lid and exophthalmos on the right, anaesthesia in the distribution of the right fifth nerve, slight weakness of the right seventh of the lower motor neuron type, and limitation of ocular movements in the horizontal plane, more so on the right. Hearing was normal. The tongue deviated slightly to the right. Abdominal reflexes were normal. Knee jerks were absent, ankle jerks were present. There was no Babinski sign, although the left plantar response was at times equivocal. Kernig's phenomenon was absent. The spinal fluid was bloody and under increased pressure. The Wassermann test was negative in both blood and spinal fluid. The right fundus could not be seen. The left fundus showed slight congestion of the veins. There was generalized wasting with hypotonia. There was no ataxia. Sensation as far as could be tested was normal. The nose bleed was accounted for by excoriation in the vestibule of the nose. There was no evidence of sinusitis. On the 17th of November, 1921, there were generalized twitchings in the extremities. The spinal puncture was repeated, the fluid was still bloody and under increased pressure. The boy subsequently had a number of convulsive seizures, one lasting three minutes, the others of shorter duration. The x-ray examination of the skull showed evidence of increased intracranial pressure, the coronal and lambdoidal sutures being pronounced. Erosion of the posterior clinoid processes was present. The floor of the sella was depressed. The urine was negative. The white cell count was 10,400, with 5 per cent polynuclear cells. The Von Pirquet test was negative. Patient was submitted to x-ray treatment without benefit. Operation was refused.

The post-mortem findings showed excoriation in the left side of the nose, right exophthalmos and broncho-pneumonia, probably terminal. The findings in the skull are as follows:

Brain: The calvarium is removed without difficulty and is somewhat thin. The dura strips readily. The brain appears large for a child of 11 years. The convolutions are somewhat flattened on both sides. The brain is removed with difficulty. At the base of the brain there is an irregular mass of material which seems somewhat friable and contains plaques varying in size, most of them about 1 mm. in diameter. This tissue is spread over the brain stem, the pons and the pyramids and extends backward to the cerebellum and into the interpeduncular space; it appears to be attached to the tissue filling the sella. On opening the latter it is seen to contain a mass of tissue which is somewhat blood stained, and mixed with blood

clot. The latter extends forward into the ethmoid cells on the left, but there is no communication with the nasal cavity on the other side. There is marked erosion of the sella, also of the torcula. There are small areas of erosion over each temporal bone. There are one or two plaques on the lateral surface of the cerebral hemispheres.

The right orbital fossa is somewhat large. On dissection of the right eyeball it was seen to contain an increased amount of vitreous humor; otherwise it appeared normal. The final pathological diagnosis has not yet been made.

The dominant findings in the case are those of middle fossa lesion on the right. (Ocular muscle palsies, anaesthesia in the distribution of the fifth with resulting neuro-paralytic keratitis and conjunctivitis.) There were slight evidences of extension of the process posteriorly (peripheral facial palsy and slight deviation of the tongue). There was also an apparent lesion of the internal fibers of the third nerve on the left but it is still to be noted that the findings outside of those pointing to the lesion of the right middle fossa were meager indeed when one considers the widespread character of the lesion. It is worth noting that there was no evidence of choked disc. This may have been due to the yielding of the sutures noted in the x-ray report. That intracranial pressure was increased was shown by the x-ray findings in the skull, the increased tension in the lumbar fluid, and possibly also the diminution of the knee jerks. The last is commonly seen in cases of hydrorrachis. The alternative explanation for the diminution of the patellar reflexes, that of possible injury to the cerebellar pathways, could not be demonstrated, although there is noted hypotonia of the musculature. The bleeding from the nose on the right side led us to consider for a time cavernous sinus thrombosis, but this diagnosis was rapidly abandoned. The protrusion of the right eyeball was not adequately explained by the autopsy findings, but it has been noted very frequently in middle fossa tumors and may be due to irritation of the sympathetic filaments which innervate the so-called Lanstroem muscle surrounding the eyeball.

Discussion: Dr. Foster Kennedy: Dr. Friedman has given this picture clearly, and one important thing that he said is the diminution and absence of deep reflexes in this case, and the possibility of this being due to intracranial pressure. There was no very great evidence of pressure or traction on the posterior spinal roots at any time. The tumor has the appearance of a multiple sarcomatosis but, while Dr. Friedman would lead you to believe that this was my diagnosis, the picture which you see in the base of the skull is not very near the picture which I had formed in my mind. My conception of the disease was a tumor primarily of the base of the skull, and secondarily of the brain. If you will look at this specimen you will find that the lesion is one of sarcomatosis. Such conditions frequently affect the meninges.

CASE OF INTERNAL COMMUNICABLE HYDROCEPHALUS BEARING UPON RECENT EXPERIMENTAL WORK

[DR. STRAUSS' ABSTRACT OF HIS REMARKS]

DR. I. STRAUSS AND DR. J. H. GLOBUS (latter by invitation). The case presented was that of a three months' old child which was admitted to the Pediatric Service of Mount Sinai Hospital. It was one of enlarged head and dimmed vision. The child had weighed six and a half pounds at birth, was breast fed for three weeks, and subsequently bottle fed. After birth the head became progressively enlarged. The child had club feet, legs were held flexed and in contracture, the arms moved freely. Fluid was removed from the ventricles, and after the removal the fontanelles remained depressed. The child was apparently blind.

The brain exhibited a marked degree of internal hydrocephalus. The cortex of both cerebral hemispheres was reduced to paper thickness. Pons, medulla and basal ganglia appeared normal in size. An India ink injection was made after death, in the ponto-cerebellar system, and the injection went forward as far as the chiasma and covered the cerebellum and the midbrain. None of the injected fluid reached the surface of the hemispheres, nor did it enter the ventricles. An examination of the meninges gives no evidence of an inflammatory process. It therefore appears that the obstruction in the subarachnoid space was a developmental defect.

Sections through the midbrain also show a rudimentary remains of the aqueduct of Sylvius, so that this case was both an obstructive and communicable type of hyprocephalus.

TERATOID CYST OF THE HYPOPHYSIS

(Pathological Material and Lantern Slide)

[ABSTRACT BY DR. GLOBUS]

DR. J. H. GLOBUS AND DR. I. STRAUSS. The tumor presented showed, in addition to the uncommon histological structure, features of clinical significance. It occurred in a girl, six years of age, who had had no previous illness and had been quite normal up to the time of the onset of symptoms, six months before admission to the hospital. At that time she became restless, markedly constipated, lost her appetite and developed polydipsia and polyuria. Several weeks later, the diagnosis of diabetes was made, and the child was treated accordingly. The child was losing strength, and would frequently complain of fatigue; she gave up playing and became confined to bed because of constant headaches and general weakness. A week before admission it was noted that the child's mouth was drawn to one side and her left shoulder dropped and would frequently

twitch. She was admitted to the hospital with the complaint of headache, fatigue, excessive thirst, enuresis, loss of appetite and weakness of left shoulder.

Physical examination: Fairly well nourished child, somewhat undersized, with a profuse growth of laguno hair all over the body. There were found ptosis of the right eyelid, weakness of the right internal rectus, left pupil larger than the right, both pupils reacting to light and accommodation. There were also left facial weakness, slight weakness of the left arm and hand, and slight weakness of the left leg. The deep reflexes were more active on the left side, though generally reduced. Gait and station were normal. The abdominal reflexes could not be elicited. Spinal fluid was negative as regards cells and Wassermann reaction. The diagnosis of neoplasm involving the posterior lobe of the pituitary and the right crus cerebri was made.

At the autopsy a large purple fluctuating mass was found at the base of the brain. It covered the optic chiasm and was adherent to the latter. Posteriorly it filled up the entire interpeduncular space. Its bulging inferior surface, which was partially free, was prolonged into a funnel-shaped process which seemed to be continuous with the pituitary body. The latter was small in size and compressed, and was lodged in a shallow and eroded sella turcica. The base of the superior surface of this mass was firmly implanted in the substance of the basal surface of the brain. It occupied the entire intrapeduncular space and, because of pressure on the adjacent structures, the optic chiasm and the optic tracts were flattened. The tuber cinereum and the mammillary bodies could not be identified since the floor of the third ventricle was stretched and flattened by the tumor mass which almost obliterated the cavity of the third ventricle by its protrusion into it. The cerebral peduncles were displaced laterally and, due to pressure, were reduced in size; this was more pronounced on the right side. The neoplasm, which contained a dark-brown, granular, semi-fluid mass, was a rather thin-walled cyst, lined by a corrugated membrane which was studded with numerous small, glistening elevations. Cholesterin crystals were present in the contents of the cyst. The cyst was four centimeters long, three and a half centimeters in width. It pressed upon and flattened both of the optic nerves and the right oculomotor. A horizontal, longtitudinal section of the brain showed the cavity of the cyst fully exposed and that, at the left of the anterior portion, its wall was thickened, giving rise to a tuberous elevation cartilaginous in consistency and somewhat translucent in appearance.

The wall of the cyst was for the most part uniform in thickness and showed a more or less uniform histological structure. It was composed of three layers. The innermost coat, a layer of stratified squamous epithelium, showed at a few points some little variation in the character and maturity of its epithelium. The middle layer consisted of loose connective tissue in which were imbedded numerous glandular acini and many small ducts. The glands appeared to be salivary in character and the ducts were lined by tall cuboidal epithelium and filled with a pink staining colloidal substance. The third

and outermost layer was composed of a fairly thin stratum of dense fibrous connective tissues forming a boundary between the brain tissue and the cyst and serving as the outer protective wall of the exposed part of the cyst.

The lining epithelium showed its strong resemblance to the epithelium of the dermis of a young embryo by its three-layered formation and by the presence of hair germs. Again accumulation of deeply staining epithelium cells in concentric layers gave rise to structures not unlike epithelial pearls. The cells in the center of these pearls appeared to undergo degeneration, the peripheral cells having retained the structure of basal-cell epithelium and showed, when stained specifically, the characteristic intercellular bridges and keratohyaline granules. In the small cartilaginous mass there were found several types of embryonic tissue of mesodermal origin such as embryonal cartilage mucous connective tissue, young fibrous tissue, newly formed bone with typical bone corpuscles, calcified trabeculi, endosteum and periosteum crowded with numerous osteoclasts, osteoblasts, osteophites, and marrow cells filled with yellow granules which on staining with specific methods gave a typical iron reaction. In addition to these structures, there was a collection of cells arranged in long cords and supported by a fine reticulum; they contained fat, and in general strongly resembled cells in sebaceous glands.

The unusual histological features of the tumor, place it among a rather small group of neoplasms, which recently, through the work of Erdheim, have been traced to misplaced embryonal remnants of the subinvoluted cranio-pharyngeal duct, though such cysts have been in the past variously described as cholesteatomata, dermoids, epidermoids and occasionally, because of the occurrence of cartilage and bone in their walls, as teratomata.

The confusion in the classification of such cystic neoplasms was due to the fact that some coincidental findings, such as cholesterin crystals, bone or cartilage, were accepted as basic and fundamental features of such tumors.

It is most probable that the various tissues found in the neoplasm described were derived from the two germ layers, ectoderm and mesoderm, which go to make up the mature skin. It is then assumed that the cyst described is a teratoid growth, autochtonous in origin, which was formed by an embryonal misplacement of cells from the two germ layers during the period of the invagination of the ectoderm and in the course of formation of the hypophysis.

The gross anatomical relations of the tumor to the hypophysis and to the structures in the floor of the third ventricle are of significance in view of the clinical manifestations pointing to a disturbance of pituitary functions. This is particularly true in the light of recent experimental works by Baily and Bremmer, who have shown that the clinical symptoms of diabetes insipidus, such as polydipsia, polyuria and cachexia, can be provoked with certainty by a lesion produced in the postinfundibular region of the hypothalamus, while the complete removal of the posterior lobe of the hypophysis does not lead to permanent production of such symptoms.

The tuber cinereum and the mammillary bodies were, and, in fact, the entire floor of the third ventricle was almost completely destroyed through pressure by the tumor mass, while the infundibular portion of the hypophysis showed no change except compression. It would appear that the findings in this case serve to support the results of the experimental work of Baily and Bremmer.

THE BIOLOGICAL INTERPRETATION OF PSYCHONEUROSIS

[Author's Abstract]

Dr. L. Grimberg. Every psychoneurotic, if carefully examined, shows some endocrine disturbances as evidences of endocrine maldevelopment. This endocrine condition is a prenatal state and forms an organic inferiority, which means that the individual in question is a vulnerable person and under certain circumstances will develop a psychoneurosis. The classification of psychoneurotics at present is done entirely from the psychological point of view. Even if the Freudian theory is accepted, the psychoneurotic is conceived as a result of a conflict going on in the individual in question, and the compensation which arises in the form of a psychoneurosis is a result of psychological maladjustment. On the other hand, an individual cannot be conceived as an entity. It is erroneous to look at him otherwise than as a sociological unit. His illness is defined not so much by his mental state as by his mental attitude. The psychoneurosis is manifested by the relations between the individual and other individuals. It is exactly that point which has been overlooked in the study of psychoneurosis, and the importance of the *milieu* in the production of psychoneurosis must be considered if we intend to reach to a proper understanding.

Based upon the theory of Weissman (on heredity) every normal individual is born with the potentiality to reach the stage in which his parents are and also with the potentiality to overreach that stage. (That determines progress.) That will explain the appearance of atavism, because there it is possible that the molecular structure of the germ cell may be so changed that regress is taking place.

I will explain the nature of the conflict which takes place between the conservative elements transmitted by heredity—egotism—and the *milieu*. The *milieu* represents all that surrounds the individual. Sociologically it is the society. Society is formed by conscious elements, but the resultant is not a conscious entity. On the other hand, this resultant of all the conscious elements—society—represents an equilibrium between the conservative factor transmitted by heredity (egotism) and the revolutionary factor (altruism). The normal individual is born with the potentiality to reach that compromise or equilibrium of the social entity from which he springs.

A classification of the psychoneurosis, based upon the study of this conflict, will give us a more reasonable and plausible explanation

of the appearance of psychoneurosis. Some of the classes of psychoneurotics are as follows:

(1) Individuals born without the potentiality of compromise. They are usually the amorals of Lombroso, the criminals and sexual perverts.

(2) Individuals born with the potentiality of compromise but at the same time the *milieu,* which comes into conflict with them at the start, like the family, is not in compromise. The result is that egotism instead of shaping itself becomes more pronounced. Or, the individual is developed into a personality with an exaggerated ego like the only child, though with the potentiality, and though the *milieu* is in compromise, but due to various causes.

(3) Individuals who at one time in a certain *milieu* were in compromise, but then came into a different *milieu* and the conflict started anew. As examples we have the racial psychoneuroses in our country.

Discussion: Dr. Russell G. MacRobert: The paper is very interesting, very well thought out; but I find myself stumbling over some parts of it. For instance, I would like to ask if Dr. Grimberg really considers that emotional stress or strain, such as fright, grief, worry and chagrin, is less important than the character of the glands of the individual in determining a psychoneurosis?

Dr. Foster Kennedy: Dr. Grimberg's subject embraces so wide a field it would not be possible to discuss it properly in so limited a time. He defines a psychoneurotic as being an individual in constant reaction with his *milieu.* I do not quite know what he means by the use of the word "reaction." If he means conflict with his *milieu* I can understand it; but reaction is not necessarily conflict. After all, the whole process of life is one of reaction to the *milieu,* and that is a perfectly normal situation, not at all the abnormal condition of emotion suggested by the use of the word psychoneurosis. Again, Dr. Grimberg said that egotism was unknown among the lower animals. In what sense did he use the word egotism in that remark?

Dr. L. Grimberg: I use the term egotism in the sense we use it in ethics. I mean conscious sacrifice. Of course there is such a thing as egotism among lower animals. About the other questions, I did not say definitely that the endocrines have any importance at all. I just made the remark that they might show an organic inferiority of the individual. About the reaction I expressed myself badly. I really did mean that the psychoneurotic is in a continuous state of conflict with his *milieu.* That is exactly what I meant.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MONTHLY MEETING, DECEMBER 15, 1921
JAMES B. AYER, M.D., PRESIDENT, in the Chair.

INFLUENCE OF VISION ON NYSTAGMUS

DR. C. L. WOOLSEY. Isaac Jones has said, "The intimate relation between the ear and the eye can be best appreciated when we realize that the ocular mechanism depends upon stimuli from the ear for precision of movement." The intimacy of this relation may be greater than anticipated if we note the inhibitory influence of vision over the outward manifestations of vestibular function.

There has been a great deal of discussion since the time of Flourens (1828) in regard to the cause of the "compensatory movements" or "with nystagmus" during rotation. When a normal pigeon is rotated, head free, certain movements of the head are noted, *i. e.*, the head seems to move slowly away from the direction of rotation, then quickly in the direction of rotation. These movements are called the "with nystagmus." Gruenberg (1907) thinks the compensatory movements may be due to the constantly changing view, but further states: "They may also be quite independent of visual impressions. One is therefore driven back to a re-examination of the semicircular canal theory, or to search for some other percursory movements or acceleration." Together with Prof. Wills, he concludes that the "compensatory movements" are due to the spin which objects are subject to when rotated. Isaac Jones (1918) states, "During the turning is a vestibular pull of the eyes to the left, that is to say, a nystagmus toward the right"—when rotating to the right. Rizto (London, 1920) concurs in this belief, briefly summed up, "The semicircular canals produce the compensatory eye movements when the head is in motion." In performing a number of experiments on the vestibular apparatus of the pigeon, it was evident that the "with nystagmus" of head or eyes during rotation depended in frequency upon the rate of rotation, ranging from 1 to 12 movements of head through 360 degrees. It was noted that the eyes did not enter into the movements *per se*, if the head was free to move, but if the head was stationary the eyes moved. It seemed probable that vision was partly responsible for these movements on account of the range from 1 to 12. Vestibular stimuli could hardly produce such a variation, consequently numerous methods were employed to overcome vision without destroying sight, but all proved unsatisfactory. Following a suggestion of Dr. Stanley Cobb, experimental amblyopia was attempted. This was best secured by injection of a saturated solution of ammonium sulphate into the retina, which

produced amblyopia without destruction of iris, allowing subsequent interpretation of nystagmus with ease. Jones states that it requires approximately ten rotations of the human to cause the "after nystagmus." Ten rotations of the normal pigeon in ten seconds produced an "after nystagmus" lasting for 3.2 to 4.6 seconds. When a pigeon with experimental amblyopia is rotated head free one revolution in 10 to 20 seconds, there was no compensatory movement or "with nystagmus" of either eyes or head, which seems to refute the idea that the "with nystagmus" was due to "vestibular stimuli." The contention may be raised that the rate of rotation was too slow to produce any movement of the endolymph, but this is erroneous, since the same pigeon with amblyopia, when rotated one revolution in 20 seconds, developed no "with nystagmus," but an "after nystagmus" lasting for 5.0 to 6.1 seconds. When rotated one-half turn in ten seconds, no "with nystagmus," but an "after nystagmus" lasting for 3.1 seconds. When rotated one-quarter turn, no "with nystagmus" developed, but an "after nystagmus" of 2.0 seconds duration. When rotated 10 times in 10 seconds there was a "with nystagmus" and an "after nystagmus" lasting for 12.0 seconds. The "with nystagmus" was due to the head being pivoted and not able to keep up with the body, hence a twisting of the head away from the direction of rotation. This "twist" disrupts the muscle balance, which is the stimuli that causes the correction and thereby producing the "with nystagmus."

In conclusion: In the normal pigeon it requires at least five revolutions to produce any appreciable "after nystagmus," which is always accompanied by a "with nystagmus." With experimental amblyopia only one-quarter of a turn in five seconds is required to produce an "after nystagmus" of two seconds duration, which is not preceded by a "with nystagmus," which when compared with the normal pigeon shows the profound influence of vision on nystagmus.[1]

PROGRESSIVE MUSCULAR DYSTROPHY IN MOTHER AND THREE CHILDREN

Dr. H. B. Eaton. Looking through the literature of this type of disorder I find we are in about the same position regarding it as we were in 1886. The family shown is a particularly good illustration of the disease. The mother says that she first noticed her difficulty when she was 15 or 16 years old by a weakness of the arm which she attributed to falling out of a swing. The two oldest children, 13 and 12, have noticed for four or five years that they were unable to do what their friends did. The second boy, for instance, couldn't play basketball. The little girl of 6 has no trace of the disease so far as I am able to find. In the woman the reflexes are gone. In the older boy there are no tendon reflexes, but in the other boy they

[1] A Preliminary Report of Experiments being done on Vestibular Apparatus of the Pigeon in the Neuropathological Department of the Harvard Medical School.

are diminished but present. The boys react to Faradism but the mother does not.

Discussion: Dr. F. J. Farnell. I have had under observation for the last six or seven years a family with dystrophy, a Jewish family of three boys and two girls. The oldest boy, 16 years old, has fully developed pseudo-muscular hypertrophy with an inability to get about. The second is a boy of 13 who is a full-fledged case and has to be carried to school. The third child is also a boy of 11 years and his disorder is fully developed. The fourth child is a girl of 8 who is quite well. The fifth child, a girl of 6 years, who is quite well. There is no evidence of this disorder in either side of the family. A rather interesting feature is the effect of sugars upon these cases. By feeding them a great deal of sugar and raising their tolerance they become more active, and the two boys who are able to get about seem to last longer at their play. The sugar content in the blood on a starvation diet is usually 90 mg. per 100 c.c of blood, which, I believe, is somewhat low. The tolerance stays up on the sugar diet. Whether this has any significance in the interpretation of the disorder I really don't know. When the first boy came under my care about eight years ago I began to give him very large doses of pineal gland, and for a while he seemed to improve and hold his own. The only additional experience I have had with endocrine glandular substance in relation to pseudo-muscular hypertrophy was a marked case of pseudo-hypertrophy which for five years has been under large doses of pineal gland, and the disorder today is no further advanced than it was five years ago. In this case also the blood chemistry in relation to the sugar metabolism showed the same picture as with these boys. The method which has been used in the feeding for the sugar tolerance is to give an ounce of honey preceding the induction by a blood sugar test, and then in one hour an examination for blood sugar again; also a third examination two hours after the honey is taken. In these cases the sugar content of the blood will remain up longer than normal. In a normal individual the tolerance will rise within the first hour and it will drop to approximately normal by the end of the second hour, which, as I understand, indicates a normal sugar retention. Should the sugar content in the blood remain up at the end of the second hour it is called a high sugar tolerance. These children to whom the sugar was given seemed to be more active and able to handle themselves better than at the time they were not taking the sugar.

Dr. D. J. MacPherson. We have one boy of 12 with this condition which started when he was about 7 years old. He has an infantile sella. I gave him pituitary substance and could see no difference except for the effect it had on his headaches, which he had on an average of once every ten days or two weeks. Without suggestion on my part that it might influence the headache, his mother reported to me that his headaches had gone. In about six months he reported that he had had no headaches during that entire time. Aside from that there was no particular change in his condition. I used the whole pituitary.

THE USE OF SODIUM CHLORIDE IN CONCUSSION OF THE BRAIN

Presentation of Cases

Dr. Hugo Mella. Many patients who have received blows on the head develop headache of an extremely persistent type—often this headache does not commence until anywhere from several hours to a week or two after the injury. These headaches are not relieved by the ordinary remedies nor can they always be considered as the result of malingering to aid the patient in obtaining compensation, as they often occur in those cases in which this problem is not involved.

Venous congestion in the fundus of the eye, or even choken disc may be found, but ordinarily nothing abnormal is elicited on physical examination; all that we find is a history of headache coming on after the cranial injury. It being a well-known fact that severe concussion of the brain may cause an oedema of such a degree as to require decompression operations to save the vision, if not life, I have thought for some time that those patients who have only the headache might very well have an oedema of the brain of a moderate degree, and that if this fluid could be removed from the brain, and the cerebral blood vessels be relieved of this pressure so as to re-establish a normal circulation, then the headache would disappear.

In 1919, Weed of Baltimore reported, in the *American Journal of Physiology,* that the injection of a 30 per cent solution of sodium chloride or a saturated solution of sodium bicarbonate into the circulatory system would reduce not only the cerebro-spinal fluid pressure but also brain bulk. This reduction of cerebro-spinal fluid pressure and brain bulk also results from the introduction of a hypertonic solution into the intestinal tract. It would not be practical to use the intravenous method in ambulatory cases, so, when the patients can tolerate it, I have them drink the salt in solution, as I believe that if a hypertonic solution will reduce brain bulk experimentally in the lower animals, it might relieve these cases of "mild" oedema of the brain. Should the patient be nauseated by the salt solution, I have the salt put up in capsules of one-half gramme each. Weed has found that the approximate dose is one gramme to every ten pounds of body weight, and has had enteric tablets of one gramme each made up and they are now on the market, but I have obtained results with both the solution and the capsules, as illustrated in the following cases:

Case 1. Massachusetts General Hospital. S. L., age 20, male, white, single. Occupation, order clerk. April 16, 1921, four days ago, fell three feet from a freight elevator. Was not unconscious, had a slight dizziness for one day, then a frontal headache came on, not severe but constant. No ringing in ears. Patient has a small wound on back of head, clean, no swelling, no surrounding tenderness.

Pupils equal, react to light and distance. No nystagmus, fundi essentially negative. Tongue protrudes in mid-line. Knee jerks and ankle jerks equal and active. Plantars normal. Prescribed sodium chloride ½ dr. in water t.i.d.

April 18, 1921. Feels better for about three hours after taking salt. Headache is relieved but returns gradually. Sodium chloride 1 dr. in water, q. 4h. April 20, 1921. No headache except a little after riding on street car on way to hospital. Advised to return to work. Sodium chloride 1 dr. t.i.d. for one week, then b.i.d. for one week. May 4, 1921. Improved. No headache, outdoor life. May 18, 1921. No headache, no nerve lesion. December 12, 1921. Patient entirely well, no return of headache.

Case II. Massachusetts General Hospital. R. M., age 14, white. Occupation, school. November 22, 1921. Fall from a team and struck on back of head and neck about two months ago. States that he was all "mixed up" and out of his head immediately after the accident, but rapidly cleared up. Two weeks later "went out of his head" and has been irrational ever since. Is now mentally retarded. Responds slowly to questions. Very deliberate in speech and movements. No convulsions. Complains of headache. Said to have been normal before accident. No external evidence of injury to skull or spine. X-ray of skull and spine negative. Slight venous congestions of fundi, no choked disc. Has diplopia but it is not constant. Half dr. sodium chloride (in capsules) q. 4h. day and night. November 23, 1921. Brighter, responds to questions very well. Says he has a dull headache but it ceases after taking salt. Sodium chloride ½ dr. t.i.d. gradually reducing in one week to once daily. November 29, 1921. No headache, talks freely. Fundi negative. Salt ½ dr. t.i.d. December 6, 1921. Improving, no headache, still a little slow in responding to questions. Continue salt ½ dr. in a. m. December 13, 1921. No headache. Discontinued salt. December 15, 1921. No salt. Complains of numbness in head, responds poorly to questions and appears quite disturbed. 8.30 p. m. given salt by mouth. 9.30 quieted down slightly but still quite disturbed. Salt was discontinued too soon.

Discussion: Dr. F. J. Farnell. Probably some of the members of this Society recall a case of oidiomycosis presented by me about three years ago. The patient showed lesions on his chest and spinal column. He was treated with potassium iodide. It required 400 grains of potassium iodide a day to keep his disease in check. The man finally got well and lived until about a year and a half ago, dying from pneumonia. His family physician emphatically said that the man did not have the oidiomycotic infection at the time of his death. The percentage of potassium iodide that the man was taking led me to feel that it might be possible to attack the problem in a different manner so that the next case coming under my observation was at the State Hospital. I made a solution of 25 per cent and gave him 200 c.c. intravenously. Within a few days the man improved and gradually recovered. He is perfectly well today and shows no evidence of his disease as far as known. At that time he had skin lesions as well as a cerebrospinal disorder. Last April a child was brought to me with this disease. I gave her a 10 per cent solution and all lesions subsided immediately. The use of hypertonic sodium iodide solution intravenously as applied in fungus disease naturally

led me to feel that it might be used for other purposes, and for two years past I have been giving hypertonic sodium iodide intravenously to three types of cases. First, those of oidiomycosis, which are cleared up almost immediately. The second group are cases of the meningitic and meningovascularis forms of syphilis. These are treated with a 10 per cent solution of sodium iodide intravenously, followed by salvarsan. The third group is the hyperemic headache, not the headache due to a blow but that which occurs periodically, and which is so severe as to keep the patient in bed for two or three days,—the type which manifests complaints of an ocular type. A series of cases of hyperemic headaches have responded immediately to a 10 per cent solution of sodium iodide. The usual procedure is 100 c.c. of a 10 per cent solution of sodium iodide intravenously every five days (made up fresh).

Dr. W. J. Mixter. I am naturally very much interested in this subject from the surgical point of view. We tried the use of hypertonic salt solution intravenously in a small series of severe cranial injuries without much effect. They were all severe and some of them were complicated cases. My own feeling is that the main effect in the traumatic case as in any other type of case treated with hypertonic salt solution is on the cerebrospinal fluid, and that there is probably comparatively little effect on the brain. This work that Dr. Mella is doing should be followed out in a larger series of cases and in the more severe type of concussion, if possible, a type which is kept in the hospital. I feel that severe concussion is definitely a subject for hospitalization, and cases can probably be followed there better than in any other way. We must remember that there is a definite rebound after the use of hypertonic salt solution, and we must be careful that our rebound is not enough to give us increased symptoms. Looking back 15 or 20 years, we find that one of the prime requisites in the proper treatment of concussion in this hospital was the most active purgation by salts. That method was dropped about the time I was house officer as being empyrical and probably of no value. I doubt if it has been carried out at all during the last few years. I believe that such purging probably did the same thing as the salt solution.

Dr. Donald Gregg. Hypertonic salt solution in the form of Epsom salts has been used by most of us for years with some success, possibly only transient, in three kinds of cases,—headache, acute alcoholism, and epilepsy. Perhaps, instead of lessening "auto-intoxication" or some other unproven condition, we have been de-hydrating the central nervous system a bit. Possibly, also, the new treatment of epilepsy by starvation gets results by a similar physiological method.

SPINAL FLUID IN MULTIPLE SCLEROSIS

Dr. H. B. Foster. Dr. Foster gave a preliminary report on his laboratory work with the cerebrospinal fluid in multiple sclerosis. He said that the 38 cases had been selected with due caution. The fluids all presented a negative Wassermann test. The cell counts were from normal to a marked increase (50 per mm.). The total

protein content, quantitatively determined by the Denis-Ayer method, was from normal to nearly three times normal. In a relatively small number of fluids was a globulin ring present with ammonium sulphate. The colloidal gold solution test gave a curve in the so-called (misnamed) paretic zone in half of all the fluids. However, if only those cases showing a progressive activity, clinically, were grouped together, the percentage giving this zone curve was considerably higher. The sugar, non-protein nitrogen, urea, uric acid, creatinin, acetone-bodies and chloride content was well within the normal limit of range. Blood correlations were made performing the biochemical tests enumerated above and the results were all within normal limits with one exception. The blood Wassermanns were also negative. The noteworthy feature of the laboratory findings in cerebrospinal fluid from multiple sclerosis cases, then, is the seeming approach to a normal fluid with the colloidal gold solution curve being a frequently occurring exception.

(The full report of this work was given before the Association for Research in Nervous and Mental Disease in New York, December 28-29, 1921, and will later appear in the Archives of Neurology and Psychiatry.)

BULLET WOUND OF BRAIN

Dr. E. W. Taylor. The following case is reported because of the unusual sequence of events in its course, especially the relation of trauma to what appeared to be epilepsy, the relief of epileptiform attacks by operation and the subsequent production of a hemiplegia with partial hemianesthesia and possibly symptoms relating to the thalamus:

The patient, a man of 32, stated that he was accidentally shot at the age of five, the bullet lodging in the brain somewhat near the surface. No operation was done, he made a good recovery, became a ship mechanic, was admitted to the army and worked in a ship yard. While at this work in November, 1916, he fell a distance of 40 to 45 feet, was unconscious but not paralyzed. Thereafter he had severe headache, and in the latter part of the month in which he was injured an epileptiform attack with apparently definite loss of consciousness. These attacks increased greatly in frequency and finally led to operation which resulted in the removal of part of the bullet, but unfortunately with a resultant hemorrhage which destroyed a considerable portion of the parietal region of the brain on the right. From this developed a severe left hemiplegia, naturally without aphasia. The epileptiform attacks ceased and he has had no recurrence, nor headache, in spite of the destruction of brain tissue following operation. He later developed a slight hemianesthesia and sudden attacks of pain which pointed somewhat toward the thalamus. His condition has not materially improved in spite of assiduous treatment.

Discussion: Dr. W. J. Mixter. This patient at operation showed a simple cyst, and about it the fragments of the bone, to which a

considerable fragment of lead was firmly adherent. On loosening the indriven fragment of bone, which measured 3 or 4 cm., there was profuse bleeding from one of the arteries of the brain which had to be checked with a tie and packed. The result was paralysis, which he now shows. I think this shows very clearly how extremely little damage to the brain will cause a rather severe type of palsy. I had no idea that he would show left-sided paralysis when he came out of ether. It was impossible at the time of operation to remove the other fragment of lead, which is in place still. I think one of the interesting points in this case is the fact that he has had no epileptic attacks since operation. Whether they will recur or not is a problem.

Dr. J. B. Ayer. To what were the epeliptic attacks due?

Dr. W. J. Mixter. The attacks were probably due to the cyst and the indriven pieces of bone.

CURRENT LITERATURE

I. VISCERAL NEUROLOGY.

1. VEGETATIVE NERVOUS SYSTEM.

Spiller, William G. THE OCULOPUPILLARY FIBERS OF THE SYMPATHETIC SYSTEM; DIVISION OF THE FIRST THORACIC ROOT IN MAN. [American Journal of the Medical Sciences, March, 1920.]

Some knowledge has been obtained regarding the position of the oculopupillary fibers of the sympathetic system in the cervical cord, medulla oblongata and pons, but scarcely anything is known of these fibers in their relation to higher parts of the brain. A case of hemiplegia was observed by the author in which the Claude Bernard-Horner syndrome was present on the side of the hemiplegia. Experimental work of importance on the animal brain has been done by Karplus and Kreidl to determine the intracerebral position of the oculopupillary fibers which seems to have established a center for the oculopupillary function in the cerebral peduncle, but the position of the fibers above this region in the cerebrum is uncertain. Spiller has come to the conclusion that in man the oculopupillary fibers do not decussate, or at least in very slight degree, in the pons or below the pons in the medulla oblongata or cervical cord. In two cases of tubercle of one-half of the pons the oculopupillary symptoms were on the side of the lesion, and he has repeatedly seen oculopupillary paralysis of the sympathetic on the side of the lesion resulting from occlusion of the posterior inferior cerebellar artery. This occlusion produces softening in the lateral part of the medulla oblongata. He describes a case of tumor of the cord in which it was necessary to divide the first thoracic root to remove the tumor, and oculopupillary paralysis occurred. The case gave the opportunity to determine the innervation of the first thoracic root in the upper limb. So far as he is able to determine this is the first case in which the symptoms resulting from division of the first thoracic root alone in man is recorded.

Kotzareff, A. PARTIAL RESECTION OF THE CERVICAL SYMPATHETIC TRUNK FOR UNILATERAL HYPERHIDROSIS. [Schweizer Archiv f. Neurol. u. Psychiat., 1920, Vol. 6, No. 1, p. 171.]

An operation on the sympathetic for hyperhidrosis is here described. The patient was a woman, 46 years of age, who for three years had suffered from excessive sweating on the right side of the face and neck and on the right shoulder, breast, and arm. The spells occurred spon-

taneously or as result of nervous irritation. Sometimes they persisted for an entire day and the patient was obliged to change her clothes six or eight times during the day. The disturbance had proved refractory to treatment. An interesting fact observed by the patient was that when she perspired there was as great dilatation of the right pupil as when her physician used atropine. During these seizures she was obliged to desist from work. When the patient came to the observation of the author the only abnormal feature found was a small protrusion at the right sterno-cleido-mastoid region in the middle of the anterior boundary of the muscle. There was no muscular atrophy of the superior members, nor other symptoms characteristic of an organic disease of the central or peripheral nervous systems. An operation was performed under local anesthesia. An incision was made parallel to the anterior border of the sterno-cleido-mastoid muscle, and when the place was reached where normally the paraganglion of Luschka is situated it was found that this element was absent. From 1 to 2 cm. of the trunk of the sympathetic was resected and the wound was closed. In eight days after the operation the patient had perspired only for fifteen minutes. When pilocarpin was administered she perspired moderately over the entire body; atropin did not produce dilatation of the pupils. The patient left the hospital with a lesion of the right cervical sympathetic presenting the syndrome of Claude-Bernard-Horner which is met with in inferior radicular paralysis of the brachialplexus and in certain lesions of the cerebral hemispheres. She was entirely cured of the hyperhidrosis, but retained a partial paralysis of the cervical sympathetic with contraction of pupils, drooping of the upper eyelid and narrowing of the palpebral slit. Four similar operations have been described since the first surgical experiment on the great cervical sympathetic by Alexander in 1889, and the author in 1917 made a partial resection of the superior sympathetic ganglia in an infant aged 7 months for multiple and voluminous angiomata with compression and irritation of the two superior cervical ganglia. [J.]

Asher, L. Central Properties in Peripheral Nerves. [Schweizer Archiv f. Neurol. u. Psychiat., 1920, Vol. 6, No. 1, p. 168.]

Summation is one of those qualities which are regarded as characteristic of the central nervous system, distinguishing the latter from the peripheral nerves. Making use of a new method the author of this paper instituted experiments to determine whether peripheral nerves do not also manifest phenomena which are of essentially the same nature as the summation in the central nervous system. By researches made in association with Dr. Tischhauser, he was able to prove the existence of the so-called simultaneous summation in peripheral nerves. For demonstration two separate points of a peripheral nerve were brought under the influence of excitants which were below the threshold of stimulation if separately applied. In the muscles belonging to the nerve, contractions set in showing that excitements of the nerve had taken

place. By means of appropriate variations of the conditions of the experiment it was possible to inhibit a stimulation above the reacting threshold (which was therefore effective) by a second stimulation below the threshold. This discovery furnishes another example of inhibition of the sort already known in the so-called Wedenski phenomenon, being an inhibition in a peripheral nerve which is wholly analagous with the sort encountered in the central nervous system. More important than the proof of the simultaneous summation that of the summation of successive stimuli, each one of which alone was below the reaction threshold. The weaker stimuli following at intervals when continued for some time gradually produced excitation, just as in the central nervous system. These phenomena of summation observed in the peripheral nervous system are qualitatively like those observed in the central nervous system.

Stewart, F. W. The Development of the Cranial Sympathetic Ganglia in the Rat. [Journ. Compar. Neurol., 1920, XXXI, 163 (36 Figs.).]

Summary: (1) Large numbers of cells of vagus origin reach the cardiac, intestinal, gastric, tracheal, œsophageal, and possibly the pharyngeal plexuses.

(2) Cells of Glossopharyngeus origin give rise to certain small ganglia of the pharyngeal wall, the posterior third of the tongue, the tympanic plexus, and, in addition, to the otic ganglion.

(3) The spheno-palatine ganglion is a ganglion belonging developmentally to the ramus palatinus VII (great superficial petrosal nerve).

(4) The spheno-palatine and otic ganglia are therefore developed from cells migrating along these nerve trunks which, in the adult, carry preganglionic fibers to the ganglia.

(5) Circumstantial evidence favors the interpretation that the submaxillary and sublingual ganglia, together with certain small ganglia of the anterior two-thirds of the tongue, are of facialis origin, the path of migration being the chorda tympani.

(6) Neuroblasts giving rise to the ciliary ganglion reach the orbit by way of the ramus ophthalmicus V.

(7) The ganglion cells of the nervus terminalis originate in a proliferation of cells of the olfactory sac.

(8) Ganglion cells of the carotid plexus and its allied plexuses, together with a portion of the cells of the tympanic plexus, arise as extensions forward from the superior cervical sympathetic ganglion. [Leonard J. Kidd, London, England.]

Parhon, J. The Cardio-respiratory Correlation in Neuropathology. [L'Encéphale, 1920, March, Vol. XV, p. 185.]

Inspiration in breathing normally causes the formation of a virtual vacuum in the thorax and thus the depletion of the blood coming from the brain and of the venous blood generally is facilitated. Whenever the

inspirations are not sufficiently complete, there is, beside the sensation of oppression, or need of air, passive venous congestion and, consequently, an augmentation of the intercranial pressure. This tension, the author thinks, may contribute to the explanation of certain pathological phenomena on the part of the nervous system, not only of the psychic disturbances in those suffering from cardiac but also many other nervous factors (from anoxemia, auto-intoxication, etc.), and among them, in some cases at least, fascicular tremors, certain sensation of neurasthenics, and migraines. In a patient observed by the author there could be no doubt of the connection between the nervous phenomena and the cardio-respiratory disturbances. This was a case of a young man who was subject to fascicular tremors in various muscles of the body (quadriceps, masseter, orbicularis oris, biceps, etc.), which were at time of such force that they resembled veritable clonic spasms. The patient had manifested respiratory insufficiency from infancy, a sequel to bronchial pneumonia. The contractions and muscular spasms first made their appearance after an attack of scarlatina. Later at puberty he had suffered from a feeling of oppression in the head and from phobias and obsessions. The author calls attention to the fact that these psychic disturbances may stand in close relation with the respiratory disturbances or perhaps with cardio-respiratory affections. Evidences of this are the facts that they develop from a neurasthenic feeling of tension in the head; they evolve on an affective foundation of anxiety; they are frequent in individuals suffering from Basedow's disease in whom anxiety is a nearly constant symptom and in whom there is also often diminution of respiratory amplitude. The author believes that the muscular spasms were due to irritation of the motor cortical centers by congestion (perhaps by microscopic hemorrhages) and to the acidifying of the blood and fluids accompanying anoxemia. Later the patient developed extrasystoles which the author is of the opinion stood in close connection with the respiratory difficulties. Neither the contractions of the voluntary muscles nor the extrasystoles appeared when there was sufficient respiratory amplitude. Psychic irritation caused the extrasystoles but with these psychic irritations there were also disturbances of respiration and of these the psychic excitement really seemed to be the conscious translation. The author, who has long held that respiratory modifications play an important rôle in affective phenomena, as a further example of the relation between cardio-respiratory function and nervous states now cites migraine, which he considers due to intercranial hypertension and venous stasis. The therapeutic effects of menthol is explained by the fact that more ample respirations are reflexly produced by it. [J.]

Naville, F., and Brütsch. HEMATOLOGY IN NEUROLOGY. [Schweizer Archiv f. Neurol. u. Psychiat., Vol. IV, No. 1, p. 88.]

The authors call attention of neurologists to a cause of vascular and circulatory disturbances of the brain and medulla which is frequently

overlooked, the physician being inclined to ascribe such nervous symptoms, when their pathogenesis is obscure, to arteriosclerosis, hypertension, fatigue, syphilis, etc. A few years ago one of the writers had opportunity to follow a certain number of difficult cases in which no satisfactory interpretation could be found for extensive vascular lesions and prolonged cerebral circulatory disturbances. Examination of the blood or the autopsy revealed manifest erythemia, and for this reason the authors are convinced that physicians should never neglect the examination of the spleen and bone marrow in disturbances of the brain circulation of obscure origin. The authors describe four cases where the nervous and mental symptoms found their explanation as a result of Vaquez's disease. Among the effects of this disease may be cortical miliary hemorrhages which spread in a slow and insidious manner, thrombi of veins and arteries, pseudo-tumors of the brain, etc., manifesting themselves in a variety of psychic and nervous phenomena, headache, unconsciousness, palsies, epileptoid attacks, and many other symptoms and combinations of symptoms which the clinician would find hard to explain in any other way. [J.]

Landwehr, J. H. Colic from Acute Angioneurotic Edema (Quincke). [Ned. Tijdschr. v. Geneeskunde. Vol. XII, No. 17, 1919.]

On August 28, 1919, Mrs. B. came to me at my consulting hours with the following complaints:

For some weeks past she had suffered in various places of the body from transitory swellings, which were neither painful nor itching, but were accompanied by an unpleasant feeling of tension. A peculiar feeling of itching and burning preceded the swellings. As a rule the symptoms had disappeared after about half an hour; sometimes, however, the swellings continued for some hours. Usually they occurred on eyelids, lips and chin, sometimes on arms, hands and feet. For the rest the patient felt quite normal. From the family anamnesis it appeared that her mother suffered from attacks of megrim, a sister from gall swellings.

As on examination of the slightly nervous lady I did not find any deviations, I requested her to call again when such a swelling had come again. Some days later she came back with a swelling which covered about the whole chin. This swelling had the color of the surrounding skin, was not warm to the touch, was not painful when pressed, and elastic; finger-pressures did not remain visible.

Later on I had once more an opportunity to see the patient when on upper and lower lip swellings were visible, which showed the same characteristics as described above. On account of their short duration and their great number, their recurrence, the absence of redness and itching, and also of burning (characteristics of ulticaria), the elastic substance of the swellings, which where they occur cause an unpleasant feeling of tension, it seemed to me most probable that this woman suffered from remittent acute edema, first described by Quincke.

Some days later I was called in, because the patient was lying abed with serious pains in the stomach. I found her writhing with pain, like one who has an attack of colic. The pain was located in the region of stomach and liver, spreading thence to the back. On examination the whole liver-region proved painful when pressed, likewise the pressure-point of Boas, which extends at about the two lower breast-vertebrae, one inch to the right of the vertebral-column. By one administration of morphia (5 mgr.) and warm swathings the attack was got under; afterwards the patient felt very limp and faint. That very evening another edematic swelling appeared under one of the eyelids. The following day she had a grayish-white stool and the urine contained many gall-chromae. No jaundice followed. Next to the swellings of the skin it is those of the mucous membranes which are prominent in the disease described by Quincke. Collins[1] found the respiratory organs affected in 21 per cent of the cases. Cases have been described in which the swelling affected the cheek-membrane, the tongue, the tonsils, the uvula, even the whole pharynx. Most important indeed is the swelling of the introitus laryngis, which gives rise to very alarming symptoms, in which case only immediate tracheotomy can often save the patient from certain death. Some (Schlesinger, Solis Cohen, Halstedt) also believe the asthma nervosum to be affected by the symptoms described by Quincke. Besides the swellings in the region of the respiratory organs, cases have also been described of intermittently occurring symptoms in stomach and intestines. In cases of a mild type they are confined to a more or less severe pain in the stomach-region, together with a feeling of tension. Later on it may be followed by nausea. Strübing[2] describes a case which showed the symptoms of tabetic crises, viz., violent pains in the stomach-region together with nausea. Besides the stomach-complaints we often see intestinal disorder, colicky pains, shooting-pains and excessive diarrhea. Halstedt, Morris and Solis Cohen diagnosed intestinal bleeding accompanying attacks.

In a case described by Morris[3], a piece of the mucous membrane of the stomach, which was strongly edematic, was found when the stomach was probed.

In the course of the disease described above, we see that a sufferer from acute recurrent edema has an attack resembling bilious colic. This attack (since that time she has had a relapse) about simultaneously with the manifold, repeatedly returning swellings of the skin, in a woman absolutely healthy before, is too remarkable to surmise an accidental co-existence of various diseases, the more so as the nature of the symptoms may be readily explained by assuming an acute swelling of the mucous membrane of the gall-ducts. This hinders the discharge of the gall; owing to the obstruction in the gall-bladder, the dilatation of the inner

[1] Am. Jour. of Med. Sciences, 1892, Vol. 104.
[2] Zeitschrift f. klin. Medis., 1885, IX.
[3] Am. Journal of the Med. Asso., Nov. 1904.

coat of this organ so rich in nerves, and perhaps a reflexive contraction of the sphincters of the gall-ducts, the symptoms of colic are called forth.

About the pathology of the Edema of Quincke researchers still disagree. While some look it to be a disturbance in the circulation of the blood, others believe that in many cases poisonous matters affect the production of lymph, either by active coöperation of the nucleated epithelial cells of the capillaries, and in consequence of this increased secretion of lymph, or by increased transmission of the tissue-cells. That often also the nervous system plays a very important part may appear from the existence of transitory edemae in nervous individuals, often under psychical influence. The medicines recommended are: regulation of the intestinal functions, lactovegetabilic diet, and, moreover, arsenic, strychnine and quinine. In the literature which was at my disposal, I did not find anywhere in the description of the internal symptoms of acute edema a case of swelling of the mucous membrane of the gall-ducts, in consequence of which the symptoms of colic arose. Therefore I thought it sufficiently important to give a brief report. [Author's abstract.]

Rolleston, J. D. Persistent Congenital Oedema of the Legs (Milroy's Disease) in Mother and Daughter. [Review of Neurology and Psychiatry, Vol. 15, p. 480.]

Familiar cases of this disease are extremely rare. In this instance the mother stated that besides herself and daughter, her mother and her mother's sister were similarly affected. Her two other children were not affected. No obvious cause for the oedema was discovered. The two cases presented the four cardinal symptoms of the condition described by Milroy in 1892: (1) congenital character; (2) limitation of the oedema to the lower limbs; (3) persistence of the oedema; (4) entire absence of constitutional symptoms. A special feature in both cases was the unilateral predominance of the oedema, the right leg in the mother, and the left leg in the daughter being chiefly affected. In addition to Milroy's original cases (nineteen cases in six generations), the only other examples of congenital and hereditary persistent oedema of the limbs in literature are those of Nonne (eight individuals affected with congenital elephantiasis in three generations) and Lortat-Jacob (congenital oedema of feet in three generations). Their pedigrees will be found in Dr. William Bulloch's article on chronic hereditary trophoedema, together with the pedigrees of other cases in which the oedema was hereditary but not congenital. As none of the recorded cases has come to autopsy, the pathogeny of the condition remains obscure. Various hypotheses have been put forward, such as congenital malformation of the trophic centers in the spinal cord for the cellular tissue (Meige), abnormal development of the mesoblast (Rapin), affection of the spinal centers for the lymph secretion (Valobra), insufficiency of the thyroid or thymus (Spiller), and endocrino-sympathetic dystrophy (Ayala). [Atwood.]

André-Thomas. Encephalic Perspiration and Spinal Perspiration. [L'Encephale, 1920, April, Vol. XV, p. 233.]

Two periods may be distinguished in the clinical evolution of wounds of the cord. During the first, called by most writers the period of shock or inhibition, there is complete paralysis of all parts innervated by the segments of the cord below the lesion. The sweat secretions are almost entirely absent in this region, appearing only on the areas belonging to that part of the cord which has preserved connection with the brain. The secretion in these areas thus offers a means for determining the level of the lesion, and is called by the author encephalic perspiration. Later a phase occurs in which activity is manifested in the section below the wound, which, though cut off from the brain, comes under the independent control of stimuli from the periphery, resulting in pilomotor reflexes, sweat reflexes, etc. From clinical observation of his cases followed by autopsy the author comes to the following conclusions concerning the localization of the spinal sudorific centers; these spinal wounds show that the sudorific fibers reaching a cutaneous territory belong to much lower segments than do the sensory fibers of the same area. There are perspiration centers for the head and neck and the upper part of the thorax to the third and fourth rib in that part of the sympathetic column which extends from the eighth cervical segment to the third dorsal. There are centers for the upper extremities in dorsal segments 5, 6, and 7, but they probably extend also somewhat lower also. The author was unable to determine from his observations just how much, but probably not far beyond the eighth dorsal. It is very likely that there are no perspiration centers situated below the third lumbar segment. In paraplegics wounded in war the sudorific reflexes behave in a manner very similar to the pilomotor reflexes, which is very natural, as their centers are situated near each other in the spine. When the spinal perspiration predominates on one side, the pilomotor reflexes are more likely on the same side, but the study of the pilomotor reflexes gives more precise and trustworthy results concerning the condition of the spinal sympathetic centers than does the study of the sudorific reflexes. Even after the spinal perspiration, together with the defense reflexes, has once made its appearance in the region below the lesion, the sudorific secretion may cease again and the perspiration above and below the lesion may alternately recur and disappear. In some cases this phenomena may be referred to a diminution of urinary secretions (in one case the autopsy revealed that the kidneys contained phosphatic calculi), or to vascular tension, but it is always evident that the two sections of the sympathetic column—the one above and the one below the lesion—do not react in the same manner when under the same influences (elements secreted by the urine). The encephalic perspiration of the uninjured part of the body remains always under the control of the brain—a circumstance which is evidence of the existence of one or several sudorific centers in the

encephalon. The author's observations, therefore, seem to explain the physiological mechanism of the sudorific secretion, showing that probably certain conditions of the fluids of the body influence the secretion by their action on centers situated above the spinal cord; and thus the anatomo-clinical experiences are brought into accord with the views expressed by physiologists. [J.]

Simons, A. Bone and Nerve. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXVII, p. 36.]

From the author's observation of a series of cases he found that as result of purely psychogenic paralysis and contractions a destruction of bone ensued. This destruction was sometimes simply indicated, sometimes slight, but in some cases profound; it involved one bone or several. After complete recovery normal bone structure may develop again. The localization and degree of the changes did not correspond to the sensory nerve supply to the bone, nor to the vasomotor disturbances, to the swelling of the tissue, nor to the physiological disturbances of sensibility, and the destruction is not a constant occurrence. Neither long continued passive exercise nor massage seem to have any influence on it. Of twelve patients with psychogenic disturbances observed by the author eight were affected with bone atrophy. Of these, two, however, had suffered slight bone injury. One had received a wound in the lower third of the tibia which had healed rapidly without plaster cast; eight weeks after the injury a club-foot developed under psychogenic influences. The other patient had sustained a slight oblique fracture of the ulna at its upper part which the Roentgen picture showed had healed successfully. If the psychogenic influences had not supervened the hand could have been used shortly after the injury and the foot of the first patient two or three weeks after the injury. The degeneration of bone was much more profound on the foot than on the hand. This is explicable by the relatively greater rigidity of the foot and the greater susceptibility of these bones to functional disturbances. The author is of the opinion that in his two cases the bone atrophy cannot be entirely referred to the continued rigidity of the limbs. The influences of wounds of this sort are more profound than becomes apparent clinically, as is the case in those relatively slight skull wounds which after years cause serious mental disturbances; the bone atrophy primarily due to a deep-seated injury could not get better because of the psychogenic rigidity of the limbs. But in the remaining cases there were no injuries to the bone, and no other influence which could alter the bone structure was active. Here the atrophy is wholly of internal origin. Nonne called attention to the fact that the normal bone findings in many cases of hysteria after prolonged absence of sensory and motor function furnish strong argument against the inactivity as cause of the atrophy, and the author raises the question in connection with his present observations whether

there is not a neurotic (reflex) bone atrophy entirely distinct from the atrophy due to inactivity. Nonne's more recent observations, together with the author's, point to a bone destruction of this nature. [J.]

Schuster, Paul. Cutaneous Nevi and Nervous Diseases. [Neurologisches Centralbl., Vol. XXXVIII, No. 8, p. 258.]

There is little information in the literature as to whether or not cutaneous nevi occur with special frequency in any definite disease group. Michel alone has given statistical data on the subject. From a material of 1,000 he found that 99 per cent of individuals over 10 years of age have cutaneous nevi, but the author points out that Michel's results, obtained from patients in hospitals, were not based on average individuals and were not therefore evidence of the conditions generally prevailing. In the total of individuals observed in recent years by the author (exact number unknown), including a large number of otherwise healthy individuals with peripheral wounds received in the field, all of whom were examined for nevi, 85 were selected because of the extraordinarily large number of these cutaneous signs found on their bodies. These were all neuropathic individuals or those with somatic defects of development, thus showing an unmistakable affinity of the nevi for endogenous nervous disease. The family anamnesis of these patients also revealed frequent examples of remarkably numerous cutaneous nevi in the relatives. These cutaneous phenomena varied from light brown or darker colored spots to small wart-like growths in most cases preserving considerable uniformity, but sometimes angiomas or skin fibromas were combined with the other more usual types. The formations were variously localized, but the author emphasizes that they never follow the course of the peripheral nerves and that it was impossible to establish any connection between the distribution and the spinal cord. The greatest number of nevi were found on a neurotic (innumerable): a paranoiac had 74; one constitutional neurasthenic 47; another 45. Dermatologists are now unanimously of the opinion that only the tendency to nevi formations is congenital and that the formations themselves appear later in life, and the author believes that a relation exists between these cutaneous affections and the constitutional moments which lead to nervous disease. [J.]

Dwyer, H. L. Chondrodysplasia: Multiple Cartilaginous Exostoses. [Am. Jour. of Dis. of Children, Vol. XIX, No. 3, March, 1920, pp. 189-200.]

Four patients presenting multiple cartilaginous exostoses are described, and the literature on the subject reviewed. In three of the patients, a man and his two children, the growths were causing no disturbance and the patients were aware of only a few of the most prominent ones on the extremities. The fourth patient, a boy of 12, came from a family in which several members were similarly affected. Small growths were

noticed in infancy, and these increased in size until it was necessary to remove some of them at 6 years of age, and again at 12. Those giving the most trouble were on the ventral surface of the great toe, the anterior surface of the radius, the inner side of the femur and in the popliteal space. The largest growth removed was about two-thirds the size of a lemon. Radiographic examination showed a bilateral arrangement of osteo-chondromata on the various long bones, near the epiphyseal lines, the shaft being comparatively free. The larger growths tended toward spur formation, the spur always pointing away from the nearest joint. Microscopically, the growths were found to be covered with a thickened periosteum containing isolated deposits of cartilage cells. In the cases described in the literature these isolated nests of aberrant cartilage cells within and beneath the periosteum, and in places where cartilage does not exist normally, is a characteristic feature, and is evidence that the condition is a chondrodysplasia, and not a simple hypertrophy of pre-existing cartilage. The condition is usually associated with deformities of the skeleton such as shortening, curving and thickening of the long bones. It affects only the bones of intra-cartilaginous origin. Associated neurologic manifestations that have been noted are ulnar and radial nerve-paralysis, cord lesions from endostoses, muscular dystrophy, and in one case acromegalic symptoms from a growth in the sella turcica. Injuries to blood vessels have been reported, principally trauma and aneurysm of the popliteal artery. The hereditary feature is well established; the disease can be transmitted by an apparently unaffected female, but there is no good evidence that the unaffected male can transmit the disease. Microscopically the condition has much in common with Chondystrophy (Achondroplasia), and it is suggested that a close relationship exists between them. The disease is a well-defined clinical entity and, judging from the case reports of the past few years, it is by no means rare. [Author's abstract.]

Marinesco, G. The Temperature of Skeletal Muscles. [Compt. Rend. Soc. de Biol., 1919, LXXXII, May 31, p. 561.]

Although the temperature of the skeletal muscles of animals and man has been tested by means of thermo-electric needles, but little attention has been paid to the temperature of the muscles in neuropathological conditions. Marinesco has done this in many diseases of the nervous system by means of the apparatus of Mdlle. Grunspan. In organic hemiplegia there is a lowering of temperature in the muscles of the paralyzed side, the degree of which is dependent on the duration of the affection and on the degree of contracture: it is greatest in the distal parts of the limbs. Hypothermia of the muscles is also present usually in cases of paralysis agitans, sometimes to an even greater degree than in hemiplegia, both in cases with or without tremor: the temperature of the thenar muscles may be as low as 25° C. Apparently the presence of

tremor tends to keep up the temperature of a muscle to some extent. Hypothermia of the muscles is present also in cerebral diplegia, tabes dorsalis, Friedreich's disease, myopathies, and in Thomsen's disease. The paper has some theoretical remarks, and the question of the temperature of muscles during regeneration after nerve suture is considered. [Leonard J. Kidd.]

Campbell, Alfred W. A Case for Diagnosis (Thomsen's Disease). [Med. J'nal of Australia, Sydney, Dec. 13, 1919.]

In summary, this case concerned a man, 27 years of age, who for ten or eleven years had shown apparently remarkable muscular development (Herculean type), but whose real muscular power was slight and subject to easy fatigue, whose every movement was impeded by "intention rigidity" and tendency to tonic contraction, and whose muscles showed the myotonic electrical reaction of Erb. In these respects the clinical picture fitted Thomsen's disease. It was incomplete, however, inasmuch as the marks both of familial and congenital origin were wanting (knowledge of the family history did not go beyond the present generation); also, that slow, tonic contraction of the muscle, to be induced by percussion, said to be characteristic of Thomsen's disease, was not demonstrable. In this connection it was indicated that, judging from other reports, cases varied greatly from the original form as described by Thomsen, and it was suggested that possibly the muscular reaction in question was present only in the ingravescent stage of the disease. A biopsy and microscopic examination of an excised portion of the biceps branchii muscle proved disappointingly negative. Changes reported by other writers, scattered hypertrophy of muscle fibers, increase of sarcolemma nuclei and permeation of the sarcoplasma with granules (Schiefferdecker), were not present.

Discussing the pathology of Thomsen's disease the writer thought that the character of the disease suggested a nervous more than a primary muscular origin, that might be in cerebral motor cortex, only to be disclosed by exhaustive examination, or in some synapse, for example, where nerve is switched on to muscle, or lastly, if there be truth in the hypothesis that striated muscle has a dual innervation, the twitch element being supplied by medullated fibers, the sluggish by non-medullated, then search is to be made in the non-medullated system, because the victim of Thomsen's disease is emphatically wanting in the twitch element. [Author's abstract.]

Pulay, Edwin. Myasthenia Gravis with Autopsy. [Neurol. Centralbl., Vol. XXXVIII, p. 263.]

The author communicates a well-characterized case of asthenic bulbar paralysis. The case was that of a girl, 17 years of age, who developed the usual myasthenic symptom complex, with the exception that here,

as in one of Curschmann's cases, disturbances of the bladder made their appearance in the earliest stages of the disease. The section revealed enlargement of the thyroid (a goiter), status thymico-lymphaticus-hypoplasticus, narrowing of the larger vessels, hypoplasia of the genitals, large spleen and accessory spleen. The pathologico-histological examination revealed no change in the central nervous system nor in the muscles except an accumulation of fat globules by the Marchi methods, to which Marburg has called attention. Reviewing the autopsy findings in the endeavor to throw light on the still obscure problem of the etiology of myasthenia, the author notes that, notwithstanding the presence of a goiter, no combined effects of thyroid and thymus could be established the correlation of which in producing this disease is defended by Markelow and Tobias among others; though there was a slight hyperfunction of the parathyroids the author does not see therein, with Lundborg and Chvostek, the essential etiological moment of the disease, but considers rather the condition of the thymus as part evidence of an abnormal constitution which would find expression in dysfunction of all the glands, but the dysfunction of the glands could not be regarded as the essential cause of the myasthenia, however, because there is pluriglandular disturbance in many cases there are no signs of myasthenia. Morris Brande's view that myasthenia is a neurogenic disease is also not confirmed by the anatomical findings in the author's case. Pemberton discovered increased secretion of calcium in this disease. The author is of the opinion that only a combination of all these factors furnishes an adequate etiological explanation of myasthenia. The abnormal constitution, as it were, sensitizes the endocrine glands, disturbing, not the function of a single gland, but of all of them, which is expressed in disturbances of the vegetative nervous system, producing the various neurogenic disturbances. The reason for the affection of the muscular system is found in a predisposing inferiority which in turn stands in connection with the abnormalities of calcium metabolism. In some cases of degenerative endocrine disturbances affecting the vegetative nervous system and standing in relation to disturbances of metabolism, it is the skin which is affected, in others the nervous system and in myasthenia it is the muscles which offer the locus minoris resistentiae. [J.]

Rubén, Martha. Myotonia Atrophica (Dystrophia Myotonia) with Remarkable Gibbus Formation. [Neurol. Centralbl., Vol. XXXVIII, p. 149 and p. 185.]

The case described is of a pronounced Steinert type, differing from previously published cases only in the circumstance that the long muscles of the back were affected with resulting formation of a very prominent gibbus extending along the spine, a phenomenon which may be regarded as an intensification of the symptoms belonging to this group but in no way as falling outside of the disease picture. While nearly all recent

writers regard this disease as a separate entity, Higier sees in it an aggravation of Thomsen's disease—unwarrantedly in the opinion of the writer, because myotonia atrophica, beside having a group of symptoms peculiar to itself (disappearance of fat, baldness, cataract, vasomotor and inner secretory disturbances, absence of tendon reflexes, ataxia, atrophy of testicles, etc.), is, in contrast with Thomsen's disease, always acquired, always follows a stereotyped form in regard to the muscle groups attacked, is always progressive, and is rarely familial. Though the pathological material offered for the study of this disease is astonishingly limited, the following conclusions may be drawn concerning the etiology: infections may be excluded as cause; myotonia atrophica is not a myogenic disease; for, though the myogenic explanations account for particular phenomena, as may also the factor of inner secretory disturbances, neither explanation accounts for the entire disease picture. Trauma seems sometimes to be an activating moment which determines the open manifestation of the disease. Congenital inferiority may be responsible for the disease but not inferiority of the muscular system alone. A congenital inferiority of the central nervous system is in no way excluded (Stocker believes myotonis to be due to degenerations of regions in the brain connected with those to which Parkinson's and Wilson's disease are due, *i.e.*, in the basal ganglia). Erb's assumption of a trophic neurosis of the muscles from disturbances in the central trophic apparatus is in contradiction with no other experiences and they may all be combined under this conception or subordinated to it. [J.]

Moll, J. M. Pseudo-hypertrophic Muscular Dystrophy in an African Native. [Med. Journ. of South Africa, Oct., 1919, p. 60.]

The author records a case of pseudo-hypertrophic muscular dystrophy in a male native of Shangaan, which is noteworthy in several respects. The patient is 18 years old. His history was scanty: he seems to have been ill three or four years previously, and then he improved, but within the last few months he has become worse again. He is a typical case of the disease, with lordosis, affection of gait, loose shoulders, and winging of scapulae, with weak muscles of the pelvic girdle. The hypertrophied muscles are firm and tough to the touch. He has loss of arm and knee jerks. Wassermann is negative in the blood serum. But the cerebrospinal fluid gave a weakly positive Wassermann, though there were neither cells nor globulin. The blood picture showed a slight excess of uni-nuclears (32 per cent). This peculiarity was found by Levin in several cases of the disease. Treatment with antispecifics, injections of iodolysin, and glandular extracts did no good. Moll has seen a few cases of this disease in white children in South Africa, but never over 12 years of age. He gives three illustrations of his case. [Leonard J. Kidd.]

Neumark, S. Myokimia and Muscular Changes in Scleroderma. [Schweizer Archiv f. Neurol. u. Psychiat., 1920, Vol. VI, No. 1, p. 125.]

The author reviews the cases of myokimia which have been described since Schultze, in 1895, first called attention to this disease. Very different disease pictures have been gathered together under this name, and a whole series of diseases has been called myokimia which are only symptoms of other diseases of the nerves or of the medulla oblongata. The author differentiates symptomatic myokimia from essential myokimia, stating that in a pathological sense the two forms may be distinguished from each other as follows: in essential myokimia it may be assumed that there is no somatic change in the nervous system and that the phenomena may be regarded as exclusively an expression of a neurosis; symptomatic myokimia, on the contrary, may be referred to an organic lesion in the peripheral neurons. The author describes a case observed by him, which he places in the group designated essential myokimia. Instances of this type are very rare and the author's case is further interesting from the fact that it was associated with scleroderma. In discussing the etiology the author states that pure functional disturbances in the nervous apparatus of the vessels may condition permanent changes. A prolonged pathological activity of the vasoconstrictors and vasodilators must necessarily induce disturbances of nutrition in the walls of the vessels, and thus give rise to degenerative and proliferative processes. In those diseases which are characterized by vasomotor disturbances, such as Raynaud's disease and scleroderma, the vessels are very frequently diseased. The activity of the vessel nerves is regulated reflexly by those nerve fibers which are conductors of sensibility. If the sensible vasomotor reflexes are disturbed, either through irritation or destruction of the vasomotor centers in the medulla oblongata, trophic disturbances in the tissue may result such as occur in syringomyelia, for instance. It is noteworthy that syringomyelia often occurs in connection with Raynaud's disease and scleroderma, and it is very probable that the muscle changes in scleroderma are due to purely vasomotor disturbances, and that they may therefore be referred to disease of the small muscle vessels, or in cases where these are not present, directly to disturbances of the vessel innervation. The author states that it is highly improbable that the myokimia in his case was conditioned by a disease of the face muscles, because there was no atrophy nor sclerosis of the muscles, because the vasomotor disturbances existed only in the hands and upper thigh and not in the face, and because fibrillar and fascicular twitchings in the progress of muscular changes are very rarely observed. An evidence of the purely functional origin of the twitchings was the fact that they vanished during sleep. This coincidence of scleroderma with myokimia finds satisfactory explanation, according to the author, in the assumption that they are both different manifestations of one and the same general neurosis. [J.]

Finkelnburgh, Rudolf. Nervous Disturbances of the Vessels of the Heart as a Cause of Arteriosclerosis. [Deutsche Zeitschr. f. Nervenh., Vol. LX, p. 90.]

Concerning the origin of arteriosclerosis there is diversity of opinion, some writers regarding it as due to toxic and others to mechanical influences. In reference to the view advanced that vascular heart disturbances may exercise an influence on the development of the disease, the author reviews the opinions of various writers on the subject and comes to the conclusion that in the material offered there is scanty evidence of the occurrence of arteriosclerosis as a result of vascular heart troubles from trauma, and that the cases cited in support of this origin will not bear the test of critical examination. From his own experience he describes 108 cases chosen with special reference to the light they might throw on this problem. In 169 of these cases, all of whom had long suffered from pronounced nervous cardiovascular disturbances, he was not able to discover a single instance in which there seemed to be a connection between the cardiac disturbance and the development of arteriosclerosis. In the remaining 11 cases who before the accident had manifested signs of beginning arteriosclerosis, the further observation, extending over from six to twelve years, revealed no discernible influence of the nervous results of the trauma on the arteriosclerosis in the sense of an acceleration of its development. [J.]

Schwartz, L. Dermographism and Vasomotor Disturbances. [Deutsche Ztschr. f. Nervenh., Vol. LX, p. 279.]

In the search for objective characteristics of psychoneuroses a certain significance has always been ascribed to dermographism. The author has undertaken a large number of experiments in regard to this phenomena, using an improved apparatus and technique. A dull instrument was used for producing the dermographia rubra with a pressure of 500 grammes; for the dermographia dolorosa a pointed instrument with a pressure of 50 grammes. The results showed that the dermographia dolorosa and peripherica varies with the age of the individual. There is also a slight difference between men and women. It was found that the influence of the atmospheric temperature was negligible for the dermographia dolorosa, but not for the peripherica, and for that reason the latter is of less value in making individual experiments than the former. Transitory psychic influences on dermographism cannot in all cases be avoided, even when the greatest caution is used. The dermographic reaction complexes are in general livelier in persons with nervous disease and with nervous tendencies than in normal individuals. When cure is effected the susceptibility vanishes. Some persons with normal nerves react in quite a lively manner, but there is a certain pathological boundary which is not overstepped. Hyperaemic islands are only met with in pronounced psychoneuroses and in organic diseases. There is a very obvious parallelism

between lively dermographic reactions and certain vasomotor and secretory disturbances. In neurasthenics the dermographia dolorosa reaction is livelier than in hysterics. When repeated examinations of psychoneurotics are made a great variability in results is sometimes manifested. In many respects the results of the dermographia dolorosa correspond to those of plethysmographic and tonemetric examinations. In regard to the cause of the dermographic phenomena the author states that they may possibly be due to heightened blood pressure. Weber and Bickel have shown that in conditions of mental and physical fatigue and in certain nervous diseases, including psychoneuroses, psychasthenic reactions make their appearance when there is pain or mental exertion, expectation or sensible stimulation. A cortical paresis of the vasoconstrictors is hereby conditioned, and in consequence of the resulting heightened blood pressure a passive dilatation of the vessels of the skin. In hysteria, where, according to Raff, there is no tendency to heightened blood pressure, the dermographic phenomena would not be produced, which accorded with the results of the author's experiments. [J.]

Klien, H. Entoptic Perception of the Retinal Pigment Epithelium in a Case of Migraine. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXVI, p. 323.]

The disturbances of vision and subjective phenomena of light which occur in attacks of migraine are of various sorts and have not hitherto been explained in an entirely satisfactory manner. There is an inclination to refer many of the subjective phenomena, in so far as they are not irreconcilable with a central localization, to purely central irritation, or, if the disturbances affect only one eye, to an irritation in the optic nerve. The author had opportunity to observe a case of migraine in which during the attack, an optical phenomena frequently made its appearance which could be explained in no other way than as a process in the eye itself. This phenomenon was in the form of a net made up of hexagonal meshes covering the entire field of vision; the same appearance may be produced experimentally in certain conditions of light or by pressure on the bulbus. There is no unanimity of opinion as to its cause, but the author interprets it as a perception of the epithelial pigment layer of the eye due to unequal stimulation of the elements of this layer. The occurrence of this phenomenon in migraine is explained as the result of variations in pressure in the bulbus or of vasomotor disturbances in the retina and choroid or as due to the fact that the centrifugal fibers arising in the mid-brain and following the path of the optic nerve, which were discovered by Ramon y Cajal in birds and by Monakow, Edinger and others in man, conduct stimuli which cause movements of plasma and chemical processes in the retina. However this may be, the case is of neurological interest, proving, as it does, that an optical phenomenon of irritation in a case of migraine is caused by peripheral processes in the medulla. [J.]

Latarjet and Thevenot. The Innervation of the Bladder. [Lyon Médical, 1919, CXXIII, p. 201.]

The writers record the results of their experimental study of the innervation of the bladder in dogs: all the vesical nerves come from the hypogastric ganglion. Some of these reach the ganglion from the visceral sympathetic system by the intermediation of the sacral nerve and the hypogastric nerves. Others supply to the ganglion filaments from the sacral cord by numerous anastomoses between the anterior branches of the third and fourth sacral pairs. These anastomoses represent in man the erector nerve of Eckhardt, described in the dog. The anatomy of the vesical nerves of the dog exactly resembles that of man. In the average sized dog the size of the normally distended bladder is 6 to 7 c.m. in height, 4 c.m. breadth, and 4 c.m. thickness. Twenty days after section of the hypogastric nerves at a distance from the ganglion (without touching it), the bladder of the animal is small, retracted, and free from any trophic lesion or ascending lesion of the urinary tract. During life the animal micturates often, in large quantities, and passes urine even involuntarily. Slight pressure on the vesical region leads to escape of urine by the ureter. After resection of the nervi erigentes no urine, or very little, can be passed: then retention becomes complete: the bladder distends. In order to prevent complications, the animal was sounded twice or thrice daily: at each sounding 200 grammes was drawn off. The bladders removed one month after operation are seen to be greatly distended, their walls greatly thinned, and their capacity more than doubled in spite of the daily catheterisms. The effects of resection of the hypogastric ganglia resemble those of resection of the nervi erigentes, with dysuria going on to complete and progressive retention. Unilateral resection gives virtually the same results as bilateral. Thus, suppression of the direct action of the spinal cord (section of erigentes, removal of hypogastric ganglia) gives paralysis of the urinary reservoir and its mechanical distension. The vesical sphincter, then, remains normal. But resection of the hypogastric nerves (influence of visceral sympathetic) disturbs the sphincter without absolutely abolishing its tonicity. [Leonard J. Kidd, London, England.]

Brouwer, B. A Cerebral Tumor with Bladder Symptoms. [Psychiat. en Neurolog. Bladen, 1916, Nos. 5 and 6.]

A man, 39, had had for eight years precipitate micturition and dribbling, and often incontinence on putting his hands into cold water. He had been treated for a chancre by mercurial inunction. For some years his wife had noticed sudden attacks of mental "absences": in these he could not speak, and his face became fiery red: immediately after them he was himself again. Then memory deteriorated, and he could not tackle difficult problems. His mental powers declined, and he had headache: on one occasion rectal incontinence: sexual loss. Examination

showed choked discs; lively reflexes; a very fine quick tremor in hands and legs, worse on voluntary movements, and often increased when standing; writing tremulous. Loss of interest in surroundings; mood grave and oppressed. Orientation good in all respects; but he cannot fix his attention. Memory bad for old and also recent events. Slight catalepsy. Occasionally is anxious, without knowing why. There was absence of sensory changes, of pyramidal involvement, of nystagmus, of frontal ataxy, of gait-difficulty, of power of reading, speech affection, of apraxia, of signs of Basedow's disease, and of morid (witzelsucht). Often he would jump out of bed at night for no obvious reason. Lumbar puncture showed increased pressure of spinal fluid. It did no good; but his headache became worse, temperature rose, and he died on the third day after the puncture. There had been a normal Wassermann in blood and in spinal fluid, and the bladder symptoms persisted up to his death. Necropsy showed a tumor which included both frontal lobes, but left the cerebral cortex free; it invaded the corpus callosum, and contained large softened spaces in its interior, into which hemorrhage had occurred. It had destroyed the anterior part of the callosum, and the septum lucidum, and on both sides reached the pole of the frontal lobes, and invaded the ventricles, which showed hemorrhages. In the striatum the head of the left caudate nucleus was destroyed, and part of the right caudate; and there was a small gliomatous focus in the lenticular nucleus which was otherwise free. Slight involvement of right internal capsule. The callosum shows a small focus. Brouwer says that death was not due to the lumbar puncture, but to the acute alteration of pressure relations caused by the intra-ventricular bleeding due to the relief of pressure on the fronto-callosal tumor by the puncture: frontal tumors often cause sudden death *per se*. The tremor in the limbs resembled that described by Grainger Stewart in the homolateral limbs in cases of unilateral frontal tumors. Brouwer discusses the question of cerebral vesical centers (cortex, striatum, thalamus), and concludes that frontal tumors do not give important vesical symptoms unless they involve the striatum: the same is true of callosal tumors. From his case and from a survey of the literature he suggests that there must be a functional localization in the striatum, viz., (1) in its lateral parts—the lenticular nucleus—an influence must be exercised on the tonus and the regular discharge of reflex movements by the striated muscles, and (2) in its medial part—the caudate nucleus—one on the tonus and reflex movements by the unstriped muscles, including probably the rectum as well as the bladder. (In the discussion on this paper, Muskens said that in one case of operative callosal puncture—destruction of brain-stem by a large tumor of the pontile angle—there was for a week urinary incontinence and a severe homolateral gluteal bedsore.) [Leonard J. Kidd, London, England.]

Abelous, J. E., and Soula, L. C. The Cholesterinogenic Function of the Spleen. [C. R. de l'Acad. des Sciences, 1920, CLXX, p. 619.]

In the course of a research on the action of secretion the writers found that injection of dilute hydrochloric acid into the duodenum leads to an increase of the amount of cholesterin in the arterial blood. This hypercholesterinæmia is not produced in splenectomized dogs or rabbits, nor after previous ligature of the splenic hilum. Indeed, there is often a hypocholesterinæmia. But the blood of the splenic vein contains more cholesterin than the arterial blood. Further, there is always more cholesterin in the blood of the splenic vein than in that of the sub-hepatic veins. In all their experiments the writers used Grigaut's method of extraction of cholesterin. They record some experiments *in vitro* in demonstration of their conclusion that cholesterin is formed in the spleen. The spleen has a much greater cholesterinogenic function than the liver and the adrenals. [Leonard J. Kidd, London, England.]

2. ENDOCRINOLOGY.

Kretschmer, Ernst. Familial Endocrinopathies. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XLVI, p. 79.]

In a family that fell under the author's observation he discovered a congenital condition of somatic and psychic degeneration which affected principally the male members and seemed to be directly inherited from father to son. The manifestations were as follows: eunuchoidism (small testicles, long limbs, imperfect junction of epiphysis, small skull, flat occiput), acromegalic development of nose, hands and feet, changes in the sella turcica (perceptible without Roentgen picture), disturbances of the heart vessels (variability of the pulse frequency, arteriosclerosis), dermographia, venous spasms, lymphocytosis, psychic inferiority, arthropathies with selective affection of the vertebral column and knee joints. There was also a peculiar disease of the muscles which in the loin musculature could be regarded as pseudohypertrophy with fatty formations, and in the rest of the body, especially in the shoulder region, as muscular hypertrophy without increase of function. This condition, in the center of which stands the testicle hypophysis complex, is probably to be interpreted as a polyglandular syndrome, because it can be directly referred in part to known endocrine disturbances and, for the rest, can be understood as due to such disturbances. [J.]

Gutman, J. The Ductless Glands and Constitutional Diagnosis. [Med. Rec., April 3, 1920.]

In this presentation the author calls attention to the necessity of studying the individual from the constitutional standpoint and not merely from the morphological one. He refers to the dependency of pathologic syndromes upon the constitutional habitus of the individual affected, and

points to the close relationship existing between constitutions and the endocrine glands. He calls attention to several fundamental facts which influence the nature of human constitutions:

(1) The effects of the inherited powers of the endocrines upon development;

(2) Their control of the vital metabolic processes;

(3) Their domination of the important functions occurring during the three cycles of life;

(4) Their intimate relationship and coöperative method of functioning; and

(5) The consequences following their disturbances, physiologic or pathologic.

The author further proceeds to elucidate the principles mentioned. In regard to the first, he claims that every particle of protoplasm, every granule of the impregnated ovum, carries within it the essence of the parental ductless glands and, hence, all those elements which transmit to the offspring the racial, national and familial characteristics of its progenitors. These endow the child with the phenomena which we commonly consider inherited. They determine the features which identify the offspring as Caucasian or Mongolian, Scandinavian or Italian, Gentile or Jew. They determine the unique expression, character, habits, traits, ambitions, talents, longevity and idiosyncrasies peculiar to its race and family. The writer classifies human beings into four types: the thyrotrop, adrenotrop and pituitotrop, which are understood to be pure types, and a fourth class the mixed type, including individuals with features characteristic of two or more pure types. These types, tropisms or constitutions are defined not only by characteristic external features, but also by the mental and psychic phenomena of the individual. The pathological disturbances also follow closely the constitutional habitus of an individual. The morbid phenomena which we were taught to look upon as hereditary are so only because they affect people of similar glandular tropism. It is a commonly known fact that apoplexy, diabetes, arterio-sclerosis, interstitial nephritis, affect individuals of a certain type, known as status apoplecticus, and practically never occur in another type of subjects, the thymico-lymphatic. On the other hand, chlorosis, tuberculosis, hemophilia, lymphadenoma, are known to affect thymico-lymphatic individuals and seldom the first mentioned type. This is due to the fact that these two types are made of two very dissimilar fabrics, are of different constitutions originating from two different endocrine sources, the adrenals on the one hand, the thymus on the other. Two beings of the same species Homo, but of different breeds, of unlike physical and mental capacity. This fact is of great practical value in diagnosis, because the relationship of morbid phenomena, functional and morphologic, is definite and characteristic of each type or tropism. It is also of

help in therapy because it enables the substitution of polypharmacy, empiricism and theurapeutic nihilism by individualistic and accurate opotherapy.

In reference to the endocrine control of metabolism, the author states that the growth and form of our organs depend upon the influences of the glands of internal secretion which they exercise through metabolic control. Whether an individual is to be tall or short, lean or corpulent, graceful or awkward, is all dependent upon the peculiar reactions of the different endocrine glands, individually and collectively; it depends upon whether they functionate harmoniously or discordantly; upon the possibility of overworking one gland and relaxing another. He further cites examples of the remarkable changes occurring when a gland for some reason or another undergoes hypertrophy or atrophy in individuals during the period of their development; the astonishing changes in growth, mentality and sexuality of those affected by an overgrowth of the anterior pituitary with the result of acromegaly; the marked changes in the metabolic rate, sugar tolerance, oxygen consumption and urea formation in those affected with thyroidal disease; the unusual features of the eunuchoid type which even the layman quickly recognizes and thinks peculiar. This is because normally each and every endocrine is endowed with a definite function, within definite limits and with a prescribed rate of metabolic exchange determined by the physiologic activity of the organs under its control; under abnormal conditions, the metabolic rate is altered, some functions are augmented, others are increased, and a metabolic imbalance thus occurs.

The third principle upon which constitutions are built and in which the domination of the vital functions by the endocrines is shown is illustrated by the example of a cat suddenly confronted by a dog. The sight of the enemy brings to the cat's consciousness a vivid picture of danger. The mechanism of defense and offense are brought into play when these two are brought together by chance. The biologic mechanism whereby consciousness dictates an order requiring execution is directed to the adrenals, where the activating hormones which convert the static into kinetic energy are stored in sufficient quantities to meet all emergencies and activities in the life of the animal. Vasomotor energy is known to be concentrated to a greater extent in the adrenals than elsewhere. By various efferent paths orders are issued to check immediately all immaterial activities in organs not called for in the defense or flight of the animal. Thus, gastric digestion, intestinal absorption, sexual activity and similar functions are ceased, while oxygen, glycogen and other material necessary for the most strenuous function of the defensive organs is mobilized through the agency of the vascular and nervous systems to the muscles, nerves, brain, etc. Thus, the cat's brain is cleared for full action, the mind is freed from all immaterial thought, the sight is sharp-

ened, the hearing made most acute, the cardio-respiratory apparatus prepared for forceful action, the muscular system is loaded with kinetic force and prepared to spend it all in the struggle for dear life of its owner. All this is accomplished primarily through the endocrine system and secondarily through the vegetative nervous system under the control of the former.

The author next discusses the relationship of the endocrines to each other, calling attention to the predominance of certain of the glands in certain individuals and the control of the cycles of life in all individuals by others. At certain definite periods of life certain glands play a leading rôle in the development and physiological interpretations of the organism. All others, however, at all times coöperate harmoniously with the leader. Such united action is necessary to keep the individual in perfect balance and to serve his economy best. The leading gland determines the architecture and creates an individual of its own type; the others assist in this work. Under normal circumstances harmony prevails at all times. If, however, the leading gland or any other of its associates, because of special stress, suffers exhaustion and becomes unable to respond further to its task, the remaining glands hasten to its rescue and to assume its responsibilities. Such coöperation preserves a normal balance. They cause a hyper or hypofunction of the organs under their own control to substitute the deficiencies of the organs controlled by the exhausted gland.

In discussing the fifth basic principle of endocrine constitutionalism the author shows the effects of deficient glandular inheritance and states that individuals born with defective glands show most decided morphologic and functional distortions. In those, on the other hand, in whom the glands become defective in later life, the symptoms presenting themselves depend entirely upon the extent and nature of involvement. Glands need not be incapacitated in all their valencies; they may fail in a few of their multiple functions and remain active in all others. Some glands will withstand the strains of life and functionate a lifetime, while others may fall by the wayside. Such incidents as infections, school life, puberty, courtship, marriage and childbirth may be the rock upon which the constitution of an individual endowed with poor quality endocrines may founder.

In conclusion, the author brings proof to sustain his argument that it is absolutely essential in the making of an honest and scientific diagnosis to dispense with the idea, that when a condition is labeled with a pathological name everything possible has been accomplished in the study of the case. No diagnosis is complete unless the case has also been studied from the endocrinologic viewpoint, for it helps one to decipher the whys and wherefores of the case and offers a more precise and more satisfactory explanation of encountered conditions not otherwise explainable. It enables one to individualize in diagnosis and to apply therapy which is suited to the case and is rational. [Author's abstract.]

Sterling, W. "DEGENERATIO GENITO-SCLERODERMICA" AS PLURIGLANDULAR INSUFFICIENCY. [Deutsche Ztschr. f. Nervenh., Vol. LXI, p. 192.]

The author proposes a paradigm for a separate dysendocrine symptom group and describes three cases as examples. They are cases of young women who were previously healthy and whose menstruation periods suddenly ceased. Simultaneously with the cessation of menstruation, which, the author states, may set in without any discoverable cause, or after a psychic shock or an infectious disease, a symptom complex develops resembling the so-called late eunuchoidism combined with cachexia, emaciation, inanition and, frequently, diarrhea. The expression of the face changes perceptibly and becomes aged, in marked contrast to the expression in ordinary eunuchoidism, where the expression of youth, even in aged persons, is a characteristic symptom. Parallel with these phenomena the cutaneous symptoms set in, at first being localized and superficial, but later becoming general, involving not only the entire surface of the body, but, in some instances, extending to the deep-lying parts and even to the bones. Reviewing the voluminous literature on gynecology, sclerodermy, neurology and inner secretions, the author was able to find isolated cases which could be grouped with this disease picture. He describes 25 combinations of scleroderma with inner secretory diseases, stating that these concurrences seem to be more than coincidences. It has been shown that scleroderma is connected with a hypertony of the sympathetic system. The inner secretory glands are also dependent on the regulatory and nutritive influences of this system. If any one of the inner secretory glands fails to functionate the hormone balance may be restored by a hyperfunctionating of another gland. The sympathetic system may be affected by the disharmony so that equilibrium is not restored, and when the compensatory activity fails the symptoms of pluriglandular insufficiency make their appearance, one form of which constitutes the disease picture described by the author to which he has given the name "degeneratio genito-sclerodermica." [J.]

Frazier, C. H. CHOICE OF METHOD IN OPERATIONS ON THE PITUITARY BODY. [Surgery, Gynecol., and Obstetrics, XXIX, July, p. 9 (12 Figs.).]

The methods of surgical approach to the pituitary body have by time and experience been narrowed down to two: the submucous septal (endonasal) and Frazier's fronto-orbital (cranial) operation, recently modified by him. By the endonasal method the possibility of meningitis has to be reckoned with, for even in healthy subjects the sphenoidal sinuses may contain contaminating organisms. In the fronto-orbital operation approach to the sella may be made without invading a contaminating field, provided we avoid the frontal sinus. The endonasal method gives a cramped field of operation, and depends on artificial light. When, as

often happens, there is extra-sellar extension of the disease, the fronto-orbital gives a much better view of the field of operation. In the management of cysts, which occur in about 10 per cent of cases of pituitary adenomata, the fronto-orbital method has this great advantage, that it enables the operator to expose the cyst by the direct supra-sellar approach and then to remove a portion of the wall in order to prevent filling up of the cyst which occurs when mere puncture is used. Another restriction to the endonasal method is in the case of the undeveloped sinuses in children. Ultimately the choice of operation will depend on the end—results of operation. But Frazier believes the fronto-orbital method—which he describes once more—will be found to have a wider field of application than the endonasal. He seems to have overcome the cosmetic objection to the mid-forehead incision of his operation by means of closure of the wound by epidermal suture. [Leonard J. Kidd, London, England.]

Sajous, Chas. Fluctuations of Thyrosuprarenal Activity in General Disease. [New York Medical Journal, February 14, 1920.]

In the course of his paper the author reviews several features of endocrinology which bear directly upon nervous and mental diseases. Recalling that in 1903 he had pointed out that the secretion of the adrenals contributed to the blood the previously unknown constituent of the hemoglobin molecule which enabled it to become converted into oxyhemoglobin, he refers to the physiological studies of Menten and Crile as confirming this view. The author had also traced the oxidizing substance thus formed by the adrenal secretion in the lungs, and which he terms "adrenoxidase," in all tissues including the entire nervous system, the axis cylinder acting as centrifugal channel (as it does for tetanotoxin, for example) for this oxidizing agent. The presence of adrenalin in the axis cylinder of nerves had been confirmed by Lichwitz and, in so far as sympathetic nerves were concerned, by Macallum. Tashiro had recently confirmed, moreover, the author's older contention that nerve fibers and the ganglia particularly were the seat of as active metabolism as any tissue in the body. Sajous also recalls that his view that strychnin produced its effects by exciting the adrenals—a fact which accounts for its vigorous action on the nervous system, through the increased adrenoxidase—had recently been confirmed by Stewart and Rogoff. He then shows that many obscure disorders, the senile "pneumonia" which carries off most aged subjects, for instance, are the result of adrenal failure, wax injection of their adrenal vascular network showing plainly when compared with similarly treated adrenals, that the vascular supply of the adrenals steadily declines as age advances.

The author attaches considerable importance to the thyroid gland in various nervous disorders, and illustrates his contention by the prominence of such disorders in Graves's disease, long considered, in fact, as a

neurosis by many leading clinicians. In this and other disorders he regards hyperthyroidism as a result of excessive defensive activity, his view that the thyroid hormone is a component of the systemic antitoxins or alexins having been repeatedly confirmed in Europe. Under the influence of a focal infection, dental, tonsillar, intestinal, etc., the thyroid may thus, in the course of a defensive reaction, break down not only the systemic fats, but also the phosphorized fats constituting the myelin of nerves, and thus provoke lesions therein. He explains in this manner the beneficial effects obtained by Berkley, Follis and others from partial thyroidectomy many years ago in appropriate cases of dementia precox, and those reported by Byron Holmes, obtained by flushing the cecum and colon through an appendicostomy opening, to overcome intestinal stasis. The author also cites a case of his own due to cecal stasis, selected owing to its severity, and identified as a case of dementia precox by several prominent psychiatrists. In this patient, aged 14½ years, a cecotomy permitting daily flushing was performed, and a diet rich in fats and lecithin orally, brought about recovery, now of nine months' standing, with total disappearance of periodical paroxysms requiring the strait-jacket, the patient having gained 47 pounds in weight the first five months following the operation. [Author's abstract.]

Weill, E., and Dufourt, A. Virilism in a Girl of Fourteen Years. [Lyon Médical, p. 620.]

The author reported to the Medical Society of the Lyons Hospital a case of virilism in a girl aged 14. She was normal till she was 10. Then her skin became rapidly covered with hair: within a few months she had a thick beard and moustache, but the hair of her head fell out considerably. She was in general of masculine type: breasts absent; male voice, thorax, and pelvis; her muscular power was great. No menses have appeared. Her psychical state tends to neurasthenia. The clitoris and labia majora are enormously hypertrophied, but the vaginal and urethral orifices are normal and normally situated. Her thyroid is rather large, without myxedema or exophthalmic goiter. There is slight achondroplasia of her limbs. No adiposity. No signs of pituitary involvement; sella normal by radiography. Cerebrospinal fluid normal. There are no detectable signs of the presence of any adrenal tumor. As a rule, these cases of virilism in the female coexist with ovarian aplasia and tumor of the adrenal cortex. [Leonard J. Kidd.]

Curschmann, Hans. Epilepsy and Tetany. [Deutsche Ztschr. f. Nervenh., Vol. LXI, p. 1.]

The author opposes the view of Bolten that in the majority of cases epilepsy and tetany are not due to a common pathological cause, but to the coincidence of parathyroid tetany and cerebral epilepsy. Bolten claims that a true pathogenic connection could only be certainly proved

where a goiter had been removed. Here the destruction of the parathyroid function would produce tetany; if the thyroid and parathyroid functions were both destroyed the result would be epilepsy and tetany, but if these functions were only congenitally reduced the result would be epilepsy; epilepsy and tetany where there was congenital absence of the thyroid and parathyroid could not be distinguished, however, from numerous other cases where there was only coincidence of the two diseases. According to the author, the occurrence of epilepsy and tetany as result of hypothyroidism can be clearly distinguished from attacks of other etiology by the accompanying myxedematous phenomena, as well as by the facts that both forms of convulsions occur simultaneously and decrease simultaneously, and that both are influenced by the administration of calcium. Additional proof of the close relationship of these two phenomena is that after the appearance of the purely epileptic attacks the stigmata of tetany (the hyper-irritability of Chvostek, Erb and Trousseau) are simultaneously intensified. From experiments with calcium it has been ascertained that the irritability of the brain is influenced by the absence of the parathyroid functions—wholly independently of the thyroid itself. The epithelial cellules by means of a hormone influence the calcium metabolism in the central nervous system, the absence of the function results in a poverty of calcium in the entire central nervous system inclusive of the brain. It has further been proved in animals deprived of the parathyroids that when calcium is administered or withheld the effect on the brain resembles very closely the effect of calcium on the peripheral nerves. It is therefore a poverty of calcium in the cortex cerebri, due to parathyroid insufficiency (without any necessary concurrent disturbance of the thyroid), which leads to pure parathyroid eclampsia or epilepsy, and which may also produce the tetany poison. From the author's experience there is not rarely a "late spasmophile" epilepsy in which after a period, sometimes of short duration, true epileptic attacks seem to grow out of the spasmophile diathesis with its eclampsic convulsions—a further proof of the parathyroid origin of epilepsy. The author cites a case in illustration of his views. Further, he discusses the rôle of the thyroid gland as a temperature regulating organ, quoting Bolten and others, who state that in animals deprived of the thyroid convulsions can be produced by raising the temperature. He has observed the same phenomenon where there was insufficiency exclusively of the parathyroids. [J.]

Roeder, C. A. Toxic Goiter and Influenza. [Surg., Gyn., Obstetrics, April, 1920, p. 357.]

Our knowledge of the pathology and symptomatology of goiter and its internal secretions has greatly increased in the past few years owing to the work of Plummer, McCarty, Wilson and Kendall of Rochester. The previously indefinite confusing terms, such as struma, strumous thyroiditis, thyroiditis, etc., have been replaced by more definite terminology, such as

hyperthyroidism (exophthalmic goiter), which is always accompanied by columnar epithelium lining the acini, and degenerating adenomata, consisting of masses of thyroid tissue surrounded by connective tissue, which so interferes with a normal blood supply and resorption that a toxin is given off, attacking primarily the cardio-vascular system. These two types represent the toxic goiters. The other type added was the colloid, so that now we speak of non-malignant goiters as (1) exophthalmic, (2) adenomatous and (3) colloid.

The etiology of all types is still the same mystery, and various authorities have thought that emotions, injuries, exhaustion, infections, etc., were factors of importance, but no definite link could be established satisfactory to medical men in general. Of late the infection theory seemed more acceptable. Of the many complications following epidemic influenza, Roeder (*Surg., Gyn., Obst., April,* 1920) reports eight marked cases of toxic goiter (3 degenerating adenomata and 5 exophthalmic) coming on immediately after the attack of influenza. Only a few weeks at the most elapsed between the infection and the onset of toxic symptoms which definitely established the etiology. These cases gave a history of no symptoms previous to the attack of influenza, although several of the toxic adenomatous cases had noticed a small goiter for some time previously but of practically negative significance. An operation was required and resulted successfully in all cases. [Author's abstract.]

Zondek, H. The Myxoedemheart and Its Treatment. [Münch. Med. Woch., 1918, No. 43, pp. 1180-1182; 1919, No. 25, pp. 681-683.]

Not all dilatations of the heart are due to a valvular defect or to the usual forms of heart muscle diseases. Through a number of striking examples the author shows that an insufficiency of the thyroid gland often leads to an expansion of the auricles and chambers of heart, which sometimes attain an enormous extent. This fact is accompanied with a marked relaxation of the pulse, which then only counts 60-50 pulsations. The action of the heart shows, when brought under the Roentgen glass, not only a distinct relaxion, but also a great superficiality and mertion. This quite corresponds to the dull and sluggish impression of the patient. Another particular feature of the myxoedemheart is the Elektrokardiogramm. The auricle elevations as well as the subsequent oscillation are absent. The absence of the former can also be proved by the curvings of the venous pulse. The subjective complaints of the patient are generally connected with the original disease. They continually suffer from chilly feelings and pasty swelling of the face and limbs, they lose their hair, the skin becomes unnaturally dry and the hands assume the appearance of paws, etc. As far as the heart is concerned, the patient must often complain of shortness of breath and flappings of the heart, and a slight cyanosis is also no seldom symptom of this disease. Not only the objective condition of the heart, but also

the subjective complaints of the patient will be cured with success through thyreoidin, which must be taken in the form of powders, daily three times, during a space of eight weeks, and then, with interruptions of three weeks, at least six or eight months. The dilatations of the heart disappear. It is not unusual that the transversal diameter of the heart diminishes and becomes 6-7 cm. smaller. The action of the heart becomes more animated. The action of the pulse increases, and gradually the failing notches of the elektrokardiogram reappear. When these have attained their usual height, then the patient may cease taking the thyreoidin powders. We also undoubtedly find abortive forms of myxoedem with transformations of the heart, such as we have just described. In such cases it is always very important to bear in mind the possibility of a thyreogene genesis, for the digitalis therapy proves quite useless here. [Author's abstract.]

II. SENSORI-MOTOR NEUROLOGY.

1. PERIPHERAL NERVES: RADICULAR SYNDROMES.

Kronthal, Paul. Biology and Functions of Nerve Cells. [Neurol. Centralbl., 1919, May 16, Vol. XXXVIII, No. 10, p. 321.]

The author asserts that the idea of the nerve cell as an organism is without scientific foundation and that the concept of its function as giving rise to stimuli is at variance with experience. The facts really known concerning the nerve cell may be summed up as follows: fibrils are very fine threads and white blood cells flow about them; the gray substance is extraordinarily rich in fibrils and it is also surrounded by numerous spaces containing white blood cells which migrate into the tissue. It would therefore be expected that in the gray substance white blood cells would be found surrounding the fibrils. The result would be a formation answering the description of the nerve cell, and we have inferred the very process by which, in the embryo, the nerve cell is formed. In the embryo, as later, the migrating cell is arrested by an element foreign to it, *i.e.*, the fibril which holds it fast and penetrates its body. This explanation, according to the author, accounts fully for the various forms of nerve cells and also for the otherwise wholly inexplicable presence of nuclear substance in them. When a sensory apparatus is stimulated, not one, but a large number of muscle cells contract. This would only be possible if the insulation of the motor path to a single muscle were removed, and the function of the nerve cell in conjunction with the fibers which traverse it is to remove this insulation. The motions which follow from stimulation of the brain cortex are simply results of the irritation of the fibers. All motions from the simplest to the most complex can be explained in this way, leaving no room for metaphysical interpretation, in the sense of a soul situated in the brain. The only function of the nervous system is to conduct stimuli, and for

this performance the nerve fiber is of more importance than the nerve cell, and it is therefore found in the lower forms of animal life and in the embryo before the cell is developed. The nerve cell is the point where the stimuli pass to various different fibrils and it neither gives rise to stimulus nor is it a nutritional center for the fiber. [J.]

Spielmeyer, W. Regeneration of Peripheral Nerves. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXVI, p. 421.]

The author, presenting the essential points concerning the regeneration of nerves from his observations in the war, sums up the anatomical processes for central as well as peripheral nerves that have been divided as follows: The newly formed nerve fibers are of polyneuclear origin, and it is from Schwann's cells that the new nerve fibers take their origin; the Cells of Schwann as an ectoderm formation do not merely constitute an "adequate medium" for the growth of the nerve fibers proceeding from the central end; the nerve fibers, as such, do not "sprout" and the ganglion cells do not thrust their neurites forward. What takes place is that in the Schwann's element projecting from the central end, as well as in the ligament fibers of the peripheral section, the new fibers originate, and in the chain of Schwann's cells the "neurofibrillary differentiations" (Borst) takes place. In the adult organism the complete construction of real nerve fibers, however, only occurs with the coöperation of "central stimuli" (Bethe). It is the processes in the peripheral part of the nerve cut off from the center which prove the neuroblastic properties of the Schwann's cells. The transformation of the undifferentiated ligament fibers into nerve-like threads can be interpreted in no other manner and furnishes conclusive demonstration of the fact that the chains of cells in the central section are not simply conduction paths for the outgrowing new nerve fibers, but that the Schwann's cells produce the nerves themselves under the influence of central stimulation. It is seen that the establishment of this fact is a confirmation of the much discussed theory of Berthe. The author recognizes the difficulty of reconciling his histological view with that which regards these elements as genetically and histologically nothing more than "peripheral glia cells." Dürck has also abandoned the view that the function of these cells is to "carry the phagocytes," and though formerly the author was an adherent of the theory that Schwann's cells functionate as a peripheral glia element, he is at the present time not in a position to a decisive attitude toward this question. He can only reaffirm that he considers the neuroblastic properties of the Schwann cells to be definitely established by his findings. A not unimportant confirmation of this view is an experience from general pathology, namely, that there are neoplasms, true neuronomas or neuronomas without ganglion cells where proliferating Schwann's cells have become tumors with fully developed medullary fibers. Borst has described an example of this sort. It is impossible to assume for these neoplasms that the elements from which

they originate are ganglion cells in the spinal cord, and there is no other view possible than to regard the Schwann elements as the real source from which the neoplasm containing medullary fibers is formed. [J.]

Pallasse and Delorme. Cervical Zona with a Generalized Eruption. [Lyon Médical, August, 1919.]

The author reported to the Lyons Society of Medical Sciences on June 25, 1919, a case of zona of the whole cutaneous area supplied by the left superficial cervical plexus, accompanied by an intense generalized polymorphous vesicular eruption resembling varicella. The patient, a man, aged 65, was slightly alcoholic: physical examination showed merely a little emphysema. The herpetic eruption appeared first as an erythema, with heat, local hyperaesthesia, and intense general symptoms; Vesicks appeared on the next day. There were numerous Vesicks disseminated over the face, trunk, and limbs, without any definite localization on the course of any nerves. There were no meningeal symptoms, yet lumbar puncture on the sixth day showed the presence of a pure lymphocytosis with a hyperleucocytosis of Nageotte's cells (40 elements to the cubic millimeter). The case is held to support Landouzy's theory of the specific infectious nature of zona. [Leonard J. Kidd.]

Döllken. Heterovaccine and Nerve Paralysis. [Neurol. Centralbl., 1919, June 1, Vol. XXXVIII, No. 11, p. 354.]

The strong neurotropic effects of various bacteria and bacterial preparations in corpore and in vitro is well known, as, for instance, the virus of tuberculosis or hydrophobia. The author describes the reactions of nerve lesions after injection into the body of heterovaccine and albumin cleavage products which, he states, have never up to the present time been described. He observed the effects on the peripheral nerves of injections of prodigiosus-staphylococcus vaccine (vaccineurin) in more than 150 cases of neuritis. If 1/200 ccm. of the vaccine is injected into the circulation three distinct phases of reaction are discernible. There is first a latent period of from 30 to 40 minutes and then the general symptoms and those due to the effect on the lesion set in. About one and one-half hours afterward the effect on the lesion becomes distinctly manifest. If the reaction is positive there is increased pain in the diseased sensory nerves and phenomena of irritation. In a paralyzed facial nerve there is often irregular twitching; if the peroneus is affected, irregular movements of the toes; in disturbances of the sciatic, spreading of the toes; of the acoustic nerve, subjective noises. If the reaction of the lesion is negative there is cessation of pain, a slight feeling of numbness, lessened sensibility of the nerve stem. This latter reaction occurs in from 15 per cent to 20 per cent of the cases. It has been conclusively proved that the negative reaction is really one of the lesion which depends on a simulation of the nerve ending, and that the process is not merely

n neutralization. If the first intravenous injection produces positive reaction of the lesion, another injection after an interval of 36 hours will usually produce a second one of the same sort, but a second injection in a shorter time is without effect, as there seems to be a sort of saturation of the nerve. In three cases the author saw both positive and negative reactions as result of the same injection. The phase of maximum effect sets in six hours after the injection and is characterized by a return of function of the diseased nerve. If the toxicity of the bacillus prodigiosus is decreased the lesion reaction is reduced and the maximal effect is not attained. Parallel experiments with pseudodiphtheritic vaccine rich in albumen and with deuteroalbumose produced the same lessened reaction as the weakened vaccineurin. The effect of these latter substances is due to the protein action, and the author sees in the results proof that the bacterial albumin and its decomposition products are not the active principle of the vaccineurin. The decomposition product of the vaccineurin (toxin), like that of the protein, has an activating effect on the protoplasm in the sense of Weichardt, but these effects are selective and the organotropic tendencies of the two substances are very different; the vaccineurin is pronouncedly neurotropic, while milk develops the strongest effect on the liver and joints. To produce progressive and permanent therapeutic effects the injections must be repeated at intervals. The author describes in detail 16 cases treated by him. [J.]

Bruijning, F. O. Herpes Zoster and Varicella. [Nederl. Tijdschr. v. Geneeskunde, 1919, Sept. 20, p. 826.]

The writer records a case of herpes and varicella occurring in the same patient. A man was admitted as a case of facial erysipelas. He had felt heavy and two days previously his face became painful; he vomited, was shivery, but had no headache; he had been feverish. He had never had erysipelas, and there was no wound; last year he had an apoplexy. He shows redness and swelling of the left face, bounded by the middle line; he has superficial gangrenous spots and vesicles above the region of the left V^2 nerve; left corneal reflex slightly diminished. No other signs. Temperature 39.1°. Four days later the temperature began to decline, but the same afternoon Bruijning was called to see the patient, who now showed abundance of varicella vesicles, quite typical. Rapid recovery from the varicella. Bruijning notes that, in contrast with Bokay's cases, his own case showed a declining temperature at the onset of the varicella. Further, the vesicles did not specially occur in places pressed on by the clothing, nor were they localized in any particular nerve area. [Leonard J. Kidd, London, England.]

Guillain and Barré, J. A Fatal Case of Landry's Ascending Paralysis Following Rapidly on Anti-typhoid Inoculation. [Presse Médicale, 1919, XXVII, July 24, p. 410.]

The writers reported to the Paris Neurological Society on July 3, 1919, a typical case of acute Landry's paralysis beginning in the lower limbs and passing up the trunk and upper limbs to the face; death by bulbar symptoms. The patient was a man in perfect health when he was inoculated with 1 c.m.c.5 of the "T. A. B." vaccine. On the same evening the Landry's symptoms set in. The spinal fluid showed only slight lymphocytosis. The connection between the inoculation and the paralysis seems to have been clear. (Several cases of corneal herpes have occurred very soon after inoculation by this "T. A. B." vaccine, but not always after the first one.) [Leonard J. Kidd.]

Grube, K. Blood Sugar in Cases of Diabetic Neuritis and Neuralgia. [Deutsche Ztschr. f. Nervenh., Vol. LX, p. 302.]

The author describes seven cases of diabetic neuritis in which there was moderate glycosuria which could be influenced by the diet. The neuritic phenomena, however, notwithstanding the light form of glycosuria, were serious and prolonged, and in some respects did not recede at all. After a time it became apparent that in contrast with the reduction of the sugar content in the urine the abnormal blood sugar content for a considerable period showed no diminution and could only be influenced very slowly. The author assumes that the neuritic phenomena were caused by this excessive amount of sugar in the blood, the sugar itself or some by-product of it acting as an irritant on the nerve tissue. Under these circumstances the diabetic neuritis would have an origin analogous to that of alcoholic neuritis. Blood sugar seems frequently to produce impotence, and this result may be brought about in the same way as the neuritis, that is to say, by an injury of the nerve substance in the erection center in the lumbosacral medulla, or in the corresponding nerve centers. [J.]

Nicolas and Roy. Herpes of the Buttock, Penis, and Scrotum. [Lyon Médical, 1919, CXXVIII, April, p. 204.]

The writers reported to the Medical Society of the Hospitals of Lyons on March 18, 1919, a case of herpes of this rather unusual distribution. At the onset there were sharp pains, with temporary dysuria. The eruption was present on the inner side of the right buttock, and extended to the right half of the scrotum and penis, the cutaneous areas affected being those of the third and fourth sacral dorsal roots. The eruption was confluent over the right half of the penis. No objective sensory changes were present. [Leonard J. Kidd.]

Niessl v. Mayendorf, Erwin. Touch-blindness After a Gunshot Wound in the Posterior Root. [Ztschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXIX, p. 282.]

A gunshot wound in the left half of the neck on the posterior border of the sterno-cleido-mastoid muscle at first produced signs of bleeding in the spinal cord or of compression due to strained or dislocated vertebrae. The permanent symptoms were a very perceptible ataxia of the right hand and loss of power to recognize objects which were placed in this hand, although the length, form, and temperature could be rightly given (touch-blindness). A further symptom was disturbance of recognition of position by the right hand. This astereognosis is to be referred to an injury of the posterior root. The case shows that the peripheral agnosia differs in no respect from one conditioned cortically, and that agnosia need not necessarily be a central associative disturbance from a cortex lesion and loss of perceptions, but that deficiencies in the tactile periphery or the paths of the same resulting in impairment of the finer sense of place localized in the skin are sufficient to interfere with the normal function of touch, even though all the other sensory qualities are relatively well preserved. It was shown besides that the arrangement of the peripheral organs receiving the impressions of sense must have an exact duplication in the grouping of the nerve elements of the brain cortex which receives the fibers coming from the periphery. The interruption of the posterior root in the author's case had prevented the awakening of the touch impressions. The touch image, which attains to consciousness in the cerebrum, must take its way unchanged through the posterior roots to the cortex, and disturbances of the sense of place in the peripheral tactile surface is of itself sufficient to destroy tactile recognition. [J.]

Gottfried, G. Nerve Cell Swellings and Accompanying Phenomena. [Ztschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. LXVI, p. 111.]

Though the fact that nerves swell is not a new discovery in histology, yet the various accompanying phenomena, conditioned by the different manner in which the swelling is produced and the different constructions of the elements affected, is both new and interesting. Schaeffer described two forms of nerve swellings, the endogenous and the exogenous. Chromolysis is common to both types, but is manifested differently. In the endogenous form the chromolysis begins with a pulverization of the peripheral layers, while the perinuclear layers at first remain intact, the nucleus retaining its central place; it does not swell and even seems to grow smaller. In the exogenous type, on the other hand, the swelling and chromolysis begin at the nucleus; the nucleus is displaced and is often lodged in the periphery. The following explanation is given for the two forms of swelling: Where there is exogenous traumatic swelling the irritation due to the lesion attacks one point of the cell, *i.e.*, the original extension of the axon which reached into the inner part; in endoge-

nous hereditary disease the nerve cell would be affected from all sides, and therefore the peripheral Nissl layers would be first attacked. Experience confirms the assertion of Schaeffer concerning the nerve swelling of external origin, and Stuurman only has observed peripheral chromolysis after eradication of a nerve, namely, in the vagus nucleus. As control of Stuurman's observation, Gottfried undertook the resection of the hypoglossus of a guinea pig, but this experiment resulted in a central chromolysis with relative preservation of the peripheral layers, corresponding with the facts observed by others. The exogenous traumatic type of nerve swelling may arise from causes of various nature, division, eradication, hemorrhage, pressure, etc., but in all the resulting forms the author found one factor constant—the injury of the neuron as an entity. The end results are in proportion to the intensity of the injury, and there may be recovery or total destruction of the swollen nerve cell. It must not be lost sight of that the characteristics of the exogenous injuries are established by experimental proof, but that for the endogenous injuries there is as yet nothing more than a theoretical foundation. [J.]

Sabrazès, J. A Case of Bilateral Meralgia Paraesthetica. [Gaz. Hebd. Sci. Med. de Bordeaux, 1919, XL, July 6, p. 152.]

Meralgia paraesthetica is almost always unilateral, but a case of obstinate bilateral meralgia is recorded briefly by Sabrazès. It occurred as a sequel of a very difficult labor in a woman whose thighs had been kept for a prolonged period in a position of abduction and semi-flexion on the pelvis. This posture produced stretching of the cutaneous nerves of the femoral region, and so set up the bilateral meralgia paraesthetica. [Leonard J. Kidd.]

Book Reviews

Brissot, M., et Bourilhet, H. La Démence chez les Epileptiques. [A. Maloine et Fils, Paris.]

This is a small volume, very clearly written, from a strictly clinical view of the mental states observed in epileptics. The authors have perhaps wisely refrained from any doctrinal presentation in view of the extreme complexity of the problem.

They have chosen to describe the progressive and incurable deterioration of intelligence which occurs with certain epileptics after a longer or shorter interval of the disease. In some respects regarding epilepsy as a syndrome, in others as a disease, they have not always clearly distinguished the two aspects, but in general the little volume is remarkably clear and succinct on the clinical side. Any deeper interpretation of what intelligence really is is not touched upon.

Zeihen, Th. Anatomie des Centralnervensystems. Zweite Abtheilung. Zweiter Teil. Mikroskopische Anatomie des Gehirns. [Gustav Fischer, Jena. 25 marks.]

Ziehen's justly prized continuation of the anatomy of the central nervous system in Bardleben's monumental contribution to human anatomy here occupies itself with the microscopical anatomy of the hind brain.

Here following his method of describing successive series of cross sections with very excellent microphotographic reproductions, Ziehen follows through the important details of structure of the pons region. Interspersed between the serial sections illuminating illustrative schematic sketches are given of the pathways connecting the nuclear topographies, and many intricate and complex points in the anatomy of this region clearly portrayed. The entire volume of approximately 300 pages is taken up with the discussion of the pontine structures.

Detailed consideration of the many problems involved is out of the question. Ziehen's extensive knowledge and his clear-cut intellectual appreciation of the many possible interpretations, his indefatigable research and broad grasp of all of the available studies, makes this section of his anatomy, like that of his preceding volume published in 1913, of inestimable value. No similar work of so detailed significance and definite authority is available up to the present time. No student of the finer anatomy of the brain can neglect the rich material here offered. [Jelliffe.]

Knight, M. M., Peters, Iva. L., and Blanchard, Phyllis. TABOO AND GENETICS. [Moffat, Yard and Company, New York.]

A work purporting to deal with the biological, sociological and psychological foundation of the family is no mean order, if it is to be seriously considered and of value to medical readers. This book is so considered, and the three authors have each dealt with the material in an extremely interesting and profitable manner. Dr. Knight has discussed the biological foundations of sex, Dr. Peters has taken up the gradual growing up of institutional control or regulation of the biological instinctive drive that makes creative evolution possible, and Dr. Blanchard has discussed the psychological integrations that have arisen—both conscious and unconscious—to make the guidance and control more and more adaptive to human permanence and individual happiness.

While we might find fault with a certain fragmentary type of exposition, on the whole a most difficult task has been rather acceptably accomplished.

Edinger, Ludwig. EINFUHRUNG IN DIE LEHRE VOM BAU UND DEN VERRICHTUNGEN DES NERVEN-SYSTEMS. III Auflage von **Kurt Goldstein** v. **A. Wallenberg.** [F. C. W. Vogel, Leipzig. 80 marks.]

Fortunately for neurology, Edinger's death has not prevented a new edition of his celebrated Introduction, the last of which appeared nearly 10 years ago and was of so much value to a former generation of neurological students. Again fortunately the publishers have found two collaborators whose competency to re-edit in a sympathetic manner this masterpiece of neurology is well recognized.

Whereas but few real changes have been introduced into this new edition, the foundations of Edinger's work have been deepened and minor points cleared up, making it, as it has been for so many years, one of the most important works of its kind for neurological students.

Lehmann, Walter. DIE CHIRURGIE DER PERIPHEREN NERVEN-VERLETZUNGEN MIT BESONDERER BERÜCKSICHTIGUNG DER KRIEG—NERVENVERLETZUNGEN. [Urban & Schwarzenberg, Berlin and Vienna.]

One of the largest chapters of war neurology has been that encompassed by the enormously fruitful observations on the peripheral nerves. The author has been in charge of the Göttingen hospital for these types of injury and has here given us the results of his neurological as well as surgical studies. Space does not permit us to go into detail concerning this splendid book. It is extremely well gotten up, beautifully printed and richly illustrated in color and line. The entire field has been extremely well covered. The literature is especially well collected. It supplements in a very complete manner the excellent work of Tinel on the same subject. The French neurologist has given us a work of paramount value from the clinical neurological side. This is an excellent companion volume on the

neurosurgical aspect of the most important subject of practical as well as theoretical interest.

Freud, Sigmund. SAMMLUNG KLEINER SCHRIFTEN ZUR NEUROSENLEHRE. 1893-1906. [Dritte Auflage. Franz Deuticke, Leipzig and Vienna.]

A third edition of the first collection of Freud's *opera minora* has been called for showing the steadily advancing interest taken in these shorter articles. They have been reprinted as they originally appeared and hence are available for those who have not heretofore been able to possess them for their own libraries. No added word of commendation is needed for this really remarkable series of penetrating psychological contributions.

Ralph, Joseph. THE PSYCHOLOGY OF NERVOUS AILMENTS. [Torquay Publishing Co., England.]

In slender brocure the author has written a very clear and succinct summary of the general Freudian doctrine of psychoanalysis. It is a very acceptable short primer of the general fundamentals.

Baur, E., Fischer, E, Lenz, F. GRUNDRISS DER MENSCHLICHEN ERBLICHKEITSLEHRE UND RASSENHYGIENE. Band I. Menschliche Erblichkeitslehre. Band II. Menschliche Auslese und Rassenhygiene. [J. F. Lehmanns Verlag, München. $2.60 bound in one volume.]

Whether the world catastrophe is going really to teach human beings anything or not, one situation is evident. That is the increasing interest taken in the problems of heredity and in race hygiene, evidence of which is contained in these two excellently prepared volumes.

The first contains a most thorough exposition of the recent acquisitions relative to general problems of human inheritance; the second a penetrating discussion of the fundamentals of race hygiene.

Interesting as the former series of questions may be, and ably presented as they are, the reviewer regretfully feels that little is to be gained from them of value to the evolution of human capacity to get on with its neighbors. Studies in heredity do not cover sufficiently the many important questions of environmental adaptation. They unfortunately are too static and pessimistic. They tell us a great deal about organ inferiorities but not much how to socially adjust to them. They lack the inspiration of effort to ameliorate conditions on the basis of individual idealism—they provide too ready a hypocritical retreat for the strong to take advantage of the weak, for the unscrupulous majority to profit at the expense of the more highly advanced ethical minority. They offer too much opportunity to make charts, and too little to work with psychological factors that make citizens.

Towards meeting this hiatus in concerted effort to improve the racial phylum the contributions to Vol. I, however, afford some elements of a progressive attitude. As such they are welcome and to be encouraged and the book to be carefully studied.

Vol. II contains a host of extremely valuable suggestions about human imperfections and practical issues that come out of them. It equally is full of common sense directions whereby these human imperfections, arising, it may be, from faulty hereditary factors, may be advantageously handled by human made institutions—laws—relief societies—insurance—etc., etc.

Two extremely valuable and helpful volumes for all neuropsychiaters interested in social problems, and particularly for those who would gain an inkling of what formulations are being constructed by a defeated nation pushed to the extreme to make better adaptations to vital problems or go under.

ACUTE EPIDEMIC ENCEPHALITIS. *By the Association for Research in Nervous and Mental Diseases.* [Paul B. Hoeber, New York.]

This unique Association which has for its main object the annual discussion of one topic of neuropsychiatric interest here presents a general abstract of the papers presented at its first annual meeting held in New York in 1920.

Since "lethargic encephalitis" presented an acute, recent and definite series of problems this subject was timely chosen. What has been learned about the disease is here very acceptably abstracted. It is a valuable production and is to be cordially recommended to all neuropsychiaters.

Kronfeld, Arthur. DAS WESEN DER PSYCHIATRISCHEN ERKENNTNISS. [Beiträge zur allgemeinen Psychiatrie I. Julius Springer. Berlin.]

Kronfeld has written here a big book. Its 500 pages are crowded and full of thought only the merest indication of which can be registered in this place.

After a preliminary statement regarding the possibilities of a metaphysically free nature investigation, the distinctions between a theory of knowledge and a critique of reason and a short outline of the Friesian school of philosophy he enters into the chief portions of his discussion.

The present tendencies in German psychiatry and psychology are extremely diverse and Kronfeld has given a most able summary of them. We recommend this extremely thoughtful and philosophical treatise to serious students of German philosophical-psychiatric tendencies. It is entitled to a much more extensive and critical review.

Bregman, L. E. DIE SCHLAFSTÖRUNG UND IHRE BEHANDLUNG. [S. Karger, Berlin.]

In a short, readable monograph the author discusses this very important problem in all of its many sided aspects. He treats of it

in a purely clinical manner and reflects the great mass of material that has grown up about the subject without any special doctrinal attitude. It is a good clinical presentation, not penetrating, but well adapted to the general requirements.

Saleeby, S. W. THE EUGENIC PROSPECT. NATIONAL AND RACIAL. [Dodd, Mead & Co., New York.]

Notwithstanding the well-recognized feuillotonistic tendencies of the author, his superficiality, and his egocentric attitudes towards many pressing problems, he nevertheless has a knack of getting vital issues on to the platform, and of stripping them down to some sort of reasonable form for progressive discussion.

We therefore feel justified in recommending the reading of this book by our readers. One does not want to swallow him wholesale, but with discrimination digest the definite issues he brings before the thinking public.

Conklin, E. Grant. THE DIRECTION OF HUMAN EVOLUTION. [Chas. Scribner's Sons, New York.]

This is an extremely readable book, fascinating, well written and for the most part to be accepted. The aim of true science as well as religion, he tells us, is to know the truth, confident that even unwelcome truth is better than cherished error; that the welfare of the human race depends upon the extension and diffusion of knowledge among men, and that truth alone can make us free. He leaves out "wisdom" here, forgetting Wordsworth's famous antithesis between "knowledge" and "wisdom." For much so-called knowledge is after all built on very shifting sands of custom, opportunity, and, regretfully must it be said, often wilfully directed propaganda.

The day has passed, says Conklin, when among thinking, knowing, and wise people, the general conception of evolution in its widest sense needs to be argued about. It has become a valued tool of progress to aid in solving large problems of social conduct, of government and of religion, and of ethical systems of national and international import.

It is with this large viewpoint that nothing which concerns man is foreign to the fundamental principles of life and evolution, that the author sees his general problem and moves on to describe it. He is not daunted by Chestertonian witticisms, about the death of evolution, for never in the history of mankind has there been a more tremendous need to gather up what scientific observation has told us of the forces operative below conscious levels, and to put ourselves in line with these forces and grow upward and onward.

He has told his story plainly, succinctly, sanely and with good perspective. Only one series of factors of paramount importance are neglected—so the reviewer senses it. When he tells us there is not much capacity for individual evolution; that in mind and in body the peak has been reached; that only in social or mass evolution are

to be observed the fruitions of man's already achieved powers, we raise issue with the methods with which, as a biologist and student of evolution, he has girded up his scientific loins and advanced his thesis. He is weak on the psychological side of evolution and unappreciative of the signs by which advance may be registered and structuralized into fundamentals of advance. Apart from this, the general propositions laid down, save in minor details, are valid and helpful. We recommend this work to our readers, mindful of the general criticism that the teachings of neuropsychiatry could have been integrated into his argument to its advantage and our profit.

Bailey, Harriet. NURSING MENTAL DISEASES. [The Macmillan Co., New York.]

For an excellent, systematic, readable account for nurses of mental patients this is a thoroughly well done piece of work. It should be available to all those doing this branch of service in the community.

Janet, Pierre. THE MAJOR SYMPTOMS OF HYSTERIA. Second Edition. [The Macmillan Company, New York.]

Thirteen years have elapsed since the first edition of this—then most masterly review of the hysterical syndrome—was published. The author has thought it inadvisable to modify it. He rationalizes this conclusion behind the belief that one would confusedly mix the ideas of one period with those of another, and in his preface would attempt an outline of his own advanced position relative to this group of manifestations termed hysteria.

These advanced positions, however, are but a feeble effort to evade the newer points of view relative to our knowledge of the conversion mechanisms which permit the so-called hysterical reactions. Unfortunately Janet has been unable himself to amalgamate the new learning with the old, and the result is an attempt to stem the tide of psychopathological advance rather than to swing loose into its tendencies and recast an old series of formulations, now more or less useless to the younger generation. It therefore is to be recommended as a historical document, recording a certain stage in the evolution of the hysteria concept made momentous by the brilliant descriptive talent of an adherent of the Charcot school.

Rivers, W. H. R. INSTINCT AND THE UNCONSCIOUS. A Contribution to a Biological Theory of the Psychoneuroses. [University Press, Cambridge, England.]

Our review of this most masterly work has been too long delayed. For it represents, to us at least, one of the real contributions within the past five years to the study of the psychoneuroses.

This is due to the fact that the author has brought a rich anthropological experience to bear upon the most important of psychopathological advances of the past generation, namely the Freudian contributions.

Inasmuch as Freud has reared his chief structure upon the phyletic history of mankind, as stored up in unconscious activities, manifesting themselves in a rich variety of symbolic outlets in metabolic disharmonies and in human conduct, the vision of an observer who has devoted a large part of his activities to such phyletic and racial components is especially valuable. They bear out the chief fundamentals of the Freudian psychology.

When the massive psychopathological probings of the World War were thrust *en bloc* directly and decisively upon the heretofore complacent medical mind, they necessitated a radical readjustment of the old views, and fortunately there were not lacking some who resolutely took off their coats to wrestle with the problems. Rivers was one of these, in England, who had breadth of vision and sufficient background to see the new dawn, and this and other important communications have issued as the result.

Furthermore, he has made a valiant, though less well-grounded effort to swing these observations into the general biological field, on the basis of physiology. The result is a real advance in outlook and a volume which demands attention and is entitled to great praise.

In only two points does the reviewer feel called upon to say a word of disapproval. These center about the use of the word suppression, and the utilization of the "all or none" principle—a premature and questionable generalization of physiology, *i.e.*, using these critical words, not as necessarily applicable to the limited physical concepts as registered in electrophysiology, but as to their usefulness in the more complicated reactions of psychopathology.

Just why Rivers should reverse the usually accepted meanings of suppression and repression in the Freudian psychology is not clear. Perhaps it is on the basis of the execrable translation of Freud's General Introduction, where the real meaning of these words as carefully discussed by Freud is entirely lost sight of, or because of an incorrigible tendency of certain personalities to go counter to accepted definitions for fear of being considered servile, we cannot say. At all events, this introduces confusion and is disadvantageous.

As for the "all or none" principle, we seriously doubt its value in a dynamic psychology where relativity is a ruling principle rather than absolutism.

Apart from these points of discontent with the author's method of handling the problems involved, we feel that the volume under consideration is one of great value. With increasing experience which will come from quiet and intensive study of individual cases—and which the work gives some evidence of lack—we feel that the author will produce further work of lasting value in psychopathology should he continue his researches in this field.

Edridge-Green, F. W. THE PHYSIOLOGY OF VISION. With special reference to Colour-Blindness. [G. Bell and Sons, Ltd., London.]

When Socrates, that doughty champion of absolutism of old, sought to impose his say so upon his Athenian disciples, he encoun-

tered a particularly irritating person called Protagoras, who kept continually saying "let us see about the facts." I enjoy your generalizations about what ought to be, Mr. Plato—but what *is!* Interestingly enough this same Protagoras utilized the facts about color-blindness as representative of his general attitude about "truth and reality." For in his famous dictum, that he took from his master, Heraclitus, that "man was the measure of all things," he outlined the pragmatic doctrine that "truth and reality were to each man as he saw things."

This work, the author tells us, has evolved, not on a basis of what people have said—and authorities(?) often they were—about what color-blindness ought to be, but what he actually found it to be. It is a result of observations on vision and on color vision which reveal new facts apart from any theory and so are applicable for any theory.

It is refreshing to find an observer cut himself loose from all the things that "ought to be" and to record things as "he found them." He, even more refreshingly, admits that they are "individual observations." Thus he proclaims not wittingly, but unwittingly, that he is a true observer. He thus hopes that his book will be one that will help students to observe for themselves and not be slaves to what others have maintained to be the truth. For truth is always in a state of flux, and cannot be rendered static and fixed if evolution of conceptions relative to nature's vast accumulation of secrets are to be made available for progress.

He thus would call attention to the many fallacies surrounding old methods of testing for color vision and outlines new and better methods of vast scientific and economic value.

Neurologists are interested in color vision. They use methods of testing for the determination of brain-tumors and many things, other than the needs of locomotive engineers, etc. Hence we feel that this most refreshing and salutary work on color vision is available.

Reik, Dr. Theodor. PROBLEME DER RELIGIONSPSYCHOLOGIE, I Teil. DAS RITUAL. [Internationaler Psychoanalytischer Verlag, G. M. B. H., Leipzig and Vienna.]

The far-reaching interest awakened by the studies embodied in this book makes one hope that this is only indeed a first part of a series of investigations which will follow. The author's own sympathetic interest has evidently been stirred whether to search into some of the broad evidences of folk custom widely distributed among primitive peoples or to investigate the deeper significance of special phenomena in the religion of a single people. He turns the penetrating light of psychoanalysis down toward the hidden origins and into the psychic significance of these phenomena. For his interest is a double one: He utilizes psychoanalytic research better to understand the complex threads of individual problems through the finding and following of these in racial or group institutions. He also brings psychoanalysis to bear upon the great problems which confront all students of race and group belief and practice. The interrelation of

the two fields for psychoanalysis is suggested also by Freud in his introduction to the work.

The subjects treated here are the couvade, a name given to certain regulations to be observed by a man toward his wife and child at the birth of the latter, and the relation of it to the unconscious fear of retribution. The widespread rites pertaining to puberty receive penetrating study. Then attention is given in the same manner to a curious form of absolution in advance from the guilt of failure to fulfill oaths, perform vows and the like, found in the Jewish religion under the form of an ancient song, Kolnidre. The remaining study is of the place of the ram's horn as a sacred instrument among this same religious people. The book combines the sympathetic attitude of the cultural student with the clear insight of the profound psychologist.

Abraham, Karl. KLINISCHE BEITRÄGE ZUR PSYCHOANALYSE AUS DEN JAHREN 1907-1920. [Internationaler Psychoanalytischer Verlag, Leipzig, Vienna, Zurich.

This collection of papers presents an amount of valuable material in a specially available manner. Abraham has collected it from an experience of fourteen years which brought him at first in a more restricted form into contact with important problems of psychiatry and psychotherapy and then through his private practice into the more extensive use of the principles of psychoanalysis. The papers are presented in such brief form, the discussions with their illustrations from individual case histories are so clear and straight to the point that they may be easily consulted for a moment's helpful reading in the problems that confront the practical psychoanalyst or for a more prolonged study. In either case the reader looks through the eyes of a keen and sympathetic worker in the field. His work has enriched his understanding of the problems involved throughout the years in which these papers have been collected, but has not altered fundamentally his original appreciative point of view. An English edition of this collection will be available in time for his readers.

Danmar, William. MODERN NIRVANAISM. [Jamaica, New York.]

Inasmuch as a constructive psychiatry is interested in all forms of symbolic formulations as attempts at functional discharge of the libido and ego urges, this small volume, belonging in the general group of mystic or spiritualistic categories, will be of interest as illustrative at the same time, an individualistic craving satisfaction, and a group type of symbolic activities functioning to keep man's reason within the broad road of social adaptation.

Watkin, Edward Ingram. THE PHILOSOPHY OF MYSTICISM. [Harcourt, Brace and Howe, New York.]

It is not many years ago since the general type of mind expression which this work gives in masterly review was in a sense universal.

Men like Galileo were of a type who were stoned by the reigning majorities that upheld the mystic traditions.

Today the pendulum has swung too far the other way, and we find as bigoted and stupid attempts to stone those who would fain use the mystic form for expression, as were the efforts made in the Middle Ages to clip the wings of the scientific type of adaptation to nature's forces.

Fortunately these stupid bigots—and some are found in our universities—cannot prevent the wider and more intelligent scientific attitude that counsels one to study phenomena and find out why they exist instead of shortsightedly and impatiently trying to crush them by silly, noisy denunciation.

It is from this wider viewpoint that real scientific curiosity would approach the investigation of phenomena coeval with the birth of mankind and steadily progressing as a part of his adaptation to social forces. Never, within recent years, at least, has there been so much interest in the general subject of mysticism, and at the same time so many publications issued from all quarters of the world of letters and books.

Of the many works which mark this period of increasing interest this one under consideration is of great excellence, not only by its stamp of learning but by reason of its breadth of sympathetic feeling. The author attempts a metaphysic which is implicit in mystical experience, a philosophy of mysticism. This Watkins defines as a philosophy which is a body of truth about the nature of ultimate reality and of our relationship to it to be derived from the content of mystical experience. This metaphysic he would erect upon a doctrine of ultimate reality, of God, as the unlimited, and of the consequent relationship between man's limited soul and the unlimited. Thus the author would attempt a philosophy of the unlimited.

St. John of the Cross is taken as a general prototype as one of the greatest of all mystics of actual attainment, and as one who, in contrast with most mystics who have described their experience in confused and disordered form, has been unrivalled in his capacity for penetration, clarity and harmony. The Spanish School is taken as the clearest exponent of coherent and methodical exposition.

It would take us too far afield to attempt a critical resumé of this really absorbing work if one can by a twist of the usual medical mind throw oneself into sympathetic understanding of what is being attempted. Whether it makes the matter any clearer or not by saying, in such medical terms, that one is trying to get into intuitive or instinctive relation to the unconscious, usually the collective unconscious of Jung, is a matter of real insignificance—the point is this is the way many people express their experience, and as such is entitled to careful consideration. One does not explain nor understand phenomena by calling them by opprobious terms—a fashion too long reigning in so-called orthodox science.

Thomson, J. Arthur. THE SYSTEM OF ANIMATE NATURE. In Two Volumes. [Henry Holt & Co., New York.]

The Gifford Lectureship in the Scottish Universities is among those institutions which English social custom has founded and endowed as one of the hoped for instruments of advancing human welfare. The present volumes contain one of these series of endeavors which, printed in black and white, offers evidence of this hope and inspiration.

Many illustrious predecessors have done their bit—to what eventual ends only an omniscient intelligence can interpret. The desire of the founders was that each lecturer should, from his own special studies and in his own way, endeavor to make such contributions that would help others in considering the highest questions that man can ask. What kind of a world is this in which we live—a universe or a multiverse? How has it come to be as it is? Does it give any hint of a purpose? What is man's place in Nature? To what extent does our knowledge of Nature conform with our conception of God?

The one conception of the founder of these lectures was that it should be approached in a reverent, *i.e.*, a serious, manner. A biological approach has seemed to the author to fall within this conception. Nature as a *temptress* no longer holds sway. This is a purely theological conception. Nature as an orderly arrangement—a system of principles to be understood and to be followed, improved upon if possible—in the light of past efforts—this is a practical pragmatic conception. Thus the author has thought to array our body of biological conceptions as an aid to show what God may be—to carry on the thought of the founder of these lectures: The organism as a mechanism; the determinism of heredity; the struggle for existence. Is life a dismal cockpit after all and is mind a purely negligible quantity?—these among other things the work here discussed is projected to answer. Is evolution a chapter of accidents—is fate after all insurmountable? Such views, the author would show, while they tend to engender a natural irreligion, are scientifically untenable. Thus he sets himself the laudable task to combat a pessimistic philosophy and to construct an optimistic platform.

The wish as father to the thought leads him to reconcile these conflicting tendencies and in a most charming and well-grounded series of reflections leads him to the conclusion that law and order are of nature's building, and that Nature and Religion are not so far apart as a too narrow view of biological principles might assume.

In these two volumes Thomson has developed in a most fascinating and entertaining manner the general conclusion that, notwithstanding the general assumption that Animate Nature has led to a disappointing balancing of alternative propositions, a more wide-eyed vision of the biological and psychobiological concepts of organism, behavior, development, heredity, involution, and so on, which must be viewed in a philosophical view of Nature, lead to a definitely progressive attitude that the ways of God—which from a theological

attitude must be left to those conversant with theology—are the ways of Nature, and are interpretable by science.

Schultz, I. H. Die seelische Krankenbehandlung. Psychotherapie. Zweite, verbesserte Auflage. [Gustav Fischer, Jena. 48 marks.]

The first edition of this work appeared in 1918, and by reason of international politics could not be brought to our readers' attention. As it is a somewhat pretentious work, aiming at a large resumé of leading thoughts in psychotherapy, it is entitled to serious consideration.

At the outset it may be said we know of no work with as broad a platform in any language. Janet's recent three volume work might compare with it were it not such a hodgepodge of old and new material, illy organized and poorly synthesized. Walsh's large book in English might be set up in comparison, but it too shows such temperamental biases as to put it in the class of special pleading, very wordy and very interesting, but hardly passing as a logical argument based on actual experience. It lacks insight of the actual problems of psychiatry. Schultz's book, however, gets down to brass tacks, and is a logical and scholarly discussion of psychotherapeutic needs.

Psychotherapy is the most intricate and involved of all types of therapy. A real master must have a grasp of scientific data vouchsafed to but few of those who practice it. It is not the superficial appeal to emotional forces so prevalent in its practitioners, who work more havoc with human destinies than they can possibly conceive of. Thanks to intuitive forces they are not capable of accomplishing the bad results their shifty character might produce. Even the sick psyche knows the fakir and the charlatan, and only momentarily sinks to the level of the Atlantic City boardwalk homosexual pervert or the Hindoo pederast, disguised though often in great dilutions behind the high enema protagonists. From all such, even the most ultra scientific intestinal toxemia quack, a healthy residuum delivers them. With all these phases of human weakness psychotherapy must reckon.

The present volume comes as near to an appraisal of the various problems as we could expect, even though at times the author slurs over most fundamental situations, and unduly idealizes human capacities for perverse gratifications. This is the chief fault of the work under discussion. The author seems afraid to come to grips with certain actual situations. Love, hate, and anger, money, envy, and greed, he does not wish to see. He seems to desire to cover them in a cottonbatting of Latin and Greek terminologies and handle them with tongs and forceps, from afar. The modern cry of getting down to essentials—he would seek to evade and cover up behind a terminological verbiage of diplomacy.

Notwithstanding this scientific prudery we heartily recommend this very intellectualistic product.

Galloway, Thomas W. THE SEX FACTOR IN HUMAN LIFE. [The American Social Hygiene Association, New York.]

Written as this volume is expressly and primarily for groups of college men joined together for voluntary discussion of those points at which sex bears most directly upon the happiness and sanity of every life, the chief if not the only problem of the reviewer is to state wherein and how well it furthers these goals.

In general our reaction is one very favorable to the work, both as to its manner and its material.

He starts with statements of human appetites as biological hereditary patterns of value and of importance. The sex instinct is then taken up specifically. Then right and wrong uses of appetite are discussed, and then chapters on related subjects follow, all brought together in question and answer form. This form has its advantages and disadvantages. The author has woven a very useful fabric—a little too elementary, we believe, for college students, for they should be able to go further into the problems of rationalization and of repression and the various camouflages that reveal more than they conceal—to the inquiring student—of the faulty uses of the sex appetite hiding behind disguises which are seldom penetrated, or revealed after serious disaster has resulted.

Kyrle, J. SYPHILIS. Zweite Auflage. [Franz Deuticke, Leipzig v. Wien, 1922. Mk. 17.]

As an assistent in Finger's clinic in Vienna, one of the most widely recognized sources for advanced methods of treating this disease, Kyrle outlines the present day developments for the mastery of this most dreaded factor of neuropsychiatric disorder. It is a clear cut, concise and able summary of the general therapeutic resources.

Cestan et Verger. PRECIS DE PATHOLOGIE INTERNE. VOL. IV. SYSTEME NERVEUX. Troisieme Edition. [Masson et Cie, Paris. Fr. 28.]

This compact volume contains one of the most complete and practical summaries of the pathological anatomy of diseases of the nervous system with which the reviewer is acquainted. It is to be regretted that almost no work of its kind has appeared in English for a number of years. While not as exhaustive as recent similar works in Italian, German, and other European tongues, it is one that can be heartily commended.

Czerny, Ad. DER ARZT ALS ERZIEHER DES KINDES. Sechste Auflage. [Franz Deuticke, Leipzig v. Wien. Mk. 13.]

In these very readable short lectures Czerny outlines the opportunities that exist for the physician to be an educator of youth. He has handled the matter most sympathetically and genially and shown most convincingly that such an important rôle should not be neglected

by the medical profession if they would most truly conserve the health of the oncoming generations.

Freud, Sigmund. SAMMLUNG KLEINER SCHRIFTEN ZUR NEUROSENLEHRE. Zweite Folge. Dritte Auflage. [Franz Deuticke, Leigzig v. Wien.]

Occasion has been taken of calling attention to a new edition of the first series of collected papers of Freud's on the neuroses. Here is a third edition of his second series of similar papers. The chief papers here are his Fragment of a Hysteria Analysis; Testimony and Psychoanalysis; Compulsions and Religious Rituals; Character and the Anal Erotic—of particular value to the self-constituted prophets who have predicted for the past fifteen years that Freud's teachings were a dead issue; Hysterical Phantasies and Bisexuality; The Hysterical Attack; Sexual Explanations to Children; Infantile Sexual Theories; Cultural Sexual Morality and Modern Nervousness; The Poet and Phantasy. This third edition will make available to the present day increasingly greater number of serious students these fundamental newer visions of the problems connected with the psyche.

Harvey, E. Newton. THE NATURE OF ANIMAL LIGHT. [J. B. Lippincott Company, Philadelphia and London.]

Another very satisfactory and readable monograph as the fourth in the series on Experimental Biology, edited by Loeb, Morgan and Osterhout.

The general problem of bioluminescence, while of interest in more restricted fields, nevertheless is of some applicability in neuropsychiatric disciplines.

Here are special cases of photochemical reactions, which in the highly synthesized human machine are most prominently met with in the human eye and in the pigment of the human skin. With the former medical science has some trifling acquaintance; with the latter it is in abject ignorance, save for a few suggestions here and there, chiefly from dermatologists.

For the student of neurology who is interested in its activities from a broad dynamic viewpoint, rather than from a study of its problems at narrower economic levels, this work will prove suggestive and valuable.

Burr, C. B. PRACTICAL PSYCHOLOGY AND PSYCHIATRY. Fifth Edition. [F. A. Davis Company, Philadelphia.]

While originally this work was intended for training schools for attendants in mental hospitals, its value has extended its use to a much wider reading public. We have heretofore stated our belief it is one of the best of its kind. The new addition has improved it and made it even more valuable for lay readers as well as for medical men, and even specialists.

Hellpach, Willy. Die Geopsychische Erscheinungen. Zweite Auflage. [Wilhelm Engelmann, Leipzig.]

This is one of the books held up by post difficulties. The first edition was already in press when the war broke out. It was held up and in 1917 appeared completely here as a second edition. The influence of climate, of climatic resorts, of geological, geographical and other similar factors, is considered in its relation to the mental life—its diseases and its possibilities for restoration and health.

No similar systematic work of the kind is known to us; there are large works on climatology, to be sure, but none that deal with these specific applications in a really psychological manner. Weather—sunlight, cloud and rain, the temperature, its modifications, the atmospheric pressure, the moisture of the air, the temperature of the earth—these singly and these combined, in their bearing upon the personality of the individual, are all most interestingly discussed.

One of the most interesting series of pages considers periodic factors, day and night, spring, summer, autumn and winter, where are brought together many interesting data relative to bodily reactions and conduct modifications. The ideas that people have of the moon, the stars, the sun, etc., and their interrelated workings upon the psyche, these too are exhaustively discussed. Landscape features, colors, forms, mountains, lakes, etc., these also are included.

Altogether a most interesting book, filled with a wealth of material of absorbing interest.

Hall, G. Stanley. Morale. The Supreme Standard of Life and Conduct. [D. Appleton and Company, New York.]

Standards of conduct have been the ultimate search of all philosophies. Plato attempted in his intellectualistic manner to outline what was good and beautiful and the whole effort of most religions has been directed to showing the way to get prizes for long life, happiness and even everlasting bliss.

Prof. Hall has here given us, not so ambitious a series of standards, but in a simple, practical manner has written a work of great value. It attempts to show how the great international regression has in its titanic writhings attempted a synthesis of newer principles by which healing of the world's woes may ultimately be furthered. This he has generalized under the title of "Morale"—those standards by which all human institutions and human conduct may be measured. This is a super-hygienic philosophy and we can most heartily commend it to all neuropsychiaters, since it is upon the functioning of the nervous system that such a synthesis is founded and made possible.

Bühler, Karl. Die geistige Entwicklung des Kindes. Zweite Auflage. [Gustav Fischer, Jena.]

The older generation of psychiaters, pedagogs and interested fathers and mothers were acquainted with and greatly influenced by the work of Preyer on the development of the child. This was

almost the first careful series of observations on infant behavior by modern psychological methods. It gave rise to an avalanche of similar works until now the whole problem of child psychology has an enormous literature. Some of us can recall the early pessimistic notes of those who deplored this movement and recall the ironic lines about "those who would peep and botanize upon his mother's grave." Such has always been and will be the protest of intrenched interests and opinions about all efforts at getting at the whys of things. Luckily the movement has gone forward and the present volume presents an extremely able summary of the studies connected with the development of the mind in infancy. While it has for the reviewer too close an adherence to older intellectual schemes, based in part on the faculty psychology of an over-pedagogic age, nevertheless it can be most cordially recommended.

VOL. 55. MAY, 1922. No. 5.

The Journal

OF

Nervous and Mental Disease

An American Journal of Neurology and Psychiatry, Founded in 1874

ORIGINAL ARTICLES

THE TREATMENT OF GENERAL PARESIS BY INOCULATION OF MALARIA

By Professor Dr. Wagner-Jauregg

CHIEF OF THE PSYCHIATRIC CLINIC IN VIENNA

We could scarcely speak of a treatment of general paresis and tabes which had recovery in view before the knowledge of the syphilitic etiology of these diseases had been established.

There has always been a statistical literature of cases reporting the cure of general paresis the beginnings of which reach back for a hundred years.[1] Among these cases is a not insignificant number in which the cure came after a protracted suppuration or after a febrile illness.[2] Among these are some also in which this suppuration was produced with conscious intention.[3] E. Meyer[4] has systematically made such attempts by rubbing Autenrieth's ointment into the scalp of paretics, producing thereby deep suppurations.

Furthermore, remissions were often observed in the course of general paresis as is well known. These sometimes went so far that patients for a shorter or longer time were completely able to take up their work again and gave the impression of complete mental health. It is true that often after the course of weeks or months a regression appeared again and the further course was then as a rule a progressive one which could not be checked.

[1] Dubuisson. Traité de vesanie, 1816; Bouilland, De l'encephalite, 1820.

[2] A collection of these may be found in Doutrebente, Ann.. med. psych., T. XIX, 1878.

[3] A case cited by Dubuisson; further, Trélat, Ann. med. psych., 1895; Mabille, Ann. med. psych., 1882; Arndt, Deutsche med. Wochenschr., 1872.

[4] Berl. klin. Wochenschr., 1877.

The rare cases of cure as well as the frequent even if temporary remissions show that the disease process of general paresis must be one capable of remission.

We began to treat this disease antisyphilitically after the luetic nature of general paresis became known, first with the old means, mercury and iodides, later with salvarsan. Neither the old nor the new treatment of syphilis could boast of special results in regard to general paresis. Not that temporary improvement was not to be reached in that way in individual cases. The advance of the disease could be checked for a longer period especially through salvarsan. But the remissions were rarely complete and never lasting. The moment came finally, whether earlier or later, in which the fatal tragedy could no longer be warded off from the patient.

The discovery that not rarely psychoses were healed through intercurrent infectious diseases instigated me already in 1887 to the proposal that one should intentionally imitate this experiment of nature for the cure of psychoses. And already at that time I mentioned malaria as one of the diseases suitable for this. It can be artificially produced, is not too dangerous for the patient and his environment and in each case can be interrupted again.

When Robert Koch had made his tuberculin well known I first made experiments[1] with this substance, as the tuberculin made it possible to produce voluntarily one symptom of infectious diseases, the fever. I turned later chiefly to the treatment of general paresis, where I made first a preliminary attempt. I treated a number of paretics with injections of tuberculin in which at that time I never exceeded 0.1. I compared the course of the disease in those treated thus with an equal number of untreated cases.[2] The fact was established that the length of life of the paretics treated with tuberculin was essentially longer than that of the cases not treated and that the former showed a greater number and more lasting remissions than the latter. The same experiment was repeated later by Pilcz with the same results.

I began to treat paretics systematically with tuberculin since it proved so effective. I increased the dose of tuberculin as far as gm. 0.5, later to 1.00, and combined this treatment with treatment by mercury. It was proved that through this method complete

[1] Wagner-Jauregg, Ueber den Einfluss fieberhafter Erkrankungen auf Psychosen, Jahrb. f. Psychiatrie, VII, Bd., 1887.
[1] Wagner-Jauregg, Psychiatrische Heilbestrebungen, Wien klin. Wochenschr., 1895, Nr. 9; and E. Boeck, Jahrb. f. Psychiatrie, XIV, Bd., 1895.
[2] Contributed by Alexander Pilcz, Jahrb. f. Psychiatrie, XXV, Bd., 1905; and Psychiatrisch-neurolog. Wochenschrift, 1909-10, No. 49.

remission of the general paresis with return of capacity for work could be obtained not infrequently. In many cases this was lasting. I may mention that of the cases thus treated, and which I made the basis for my first communication[1] at the International Medical Congress in Budapest, 1909, some still retain their full capacity for their occupations today, 1921. The favorable results were to be observed more frequently the earlier the stage of the disease in which the treatment was carried out. In many cases, however, earlier or later, a return of the disease showed itself, which frequently could be freshly combatted by a repetition of the treatment.

The frequency of return of the disease made it desirable to find a means which would influence the paretic process still more effectively and lastingly than the tuberculin. Such a material I found in Besredka's typhus vaccine, which intravenously injected produced marked rise of temperature, frequently above 39° C., with chills.

In the course of experiments in treatment with tuberculin and vaccine extending through the years it has struck me that repeatedly just in those cases especially complete and lasting remissions occurred in which, in the course of the treatment, from any cause whatever, an infectious disease had set in, pneumonia, erysipelas, abscess, etc. This circumstance roused me to the thought that it might well be that treatment would be most effective if one directly produced an actual infectious disease in the paretic patients.

Starting from this consideration I turned back to the proposal I had made already in 1887 which I have mentioned. In the summer of 1917 I inoculated some general paretics from a soldier ill with malaria whose disease was established by clinical observation and microscopic findings as tertian malaria. From these patients I inoculated others. There were nine cases in all, some advanced, some fresh cases. The effect of this treatment in all the cases not very far advanced, that was in six of the nine cases, was a plainly favorable one. Three of them today, four years after the treatment was concluded, are still actively and efficiently at work.

This experience caused me to make the attempt again in September, 1919, to treat general paresis by inoculation of tertian malaria, and since then to use this method continuously.[2]

[1] Verhandlungen des 16 internat. med. Kongresses in Budapest, 1910, and Wiener med. Wochenschrift, 1909.

[1] Wagner-Jauregg, Psychiatr. neurolog. Wochenschrift, 1918-19, Nos. 21-22 and 39-40.

[2] Wagner-Jauregg, Wr. med. Wochenschrift, 1921, Nos. 25 and 27; and Gerstmann, Zeitschr. f. d. ges. Neurologie und Psychiatrie, 1920, 1921.

The first infection followed upon transmission from a patient with a malaria contracted in Vienna spontaneously and never previously treated with quinine. This was proved to be a tertian malaria by clinical observation and by examination of the blood. First a paretic was inoculated from this case, and then again one paretic from the other, so that we have to do now with the 37th transmission and we have treated in all more than 200 cases.

The method of inoculation consisted in taking the blood from the vein of a paretic during an attack of fever and immediately injecting the same unchanged in the quantity of 1-4 cc. subcutaneously under the skin of the back of another paretic. Besides, we rubbed some drops of malarial blood upon scarifications produced on the upper arm as in smallpox vaccination. This method, the only one employed in the first experiments in 1917, had shown itself also effective. Recently, furthermore, we have become convinced that it is not necessary to withdraw the blood for inoculation during the attack of fever, but that the blood taken in the interval between two attacks of fever is equally effective.

Attacks of malaria appeared after an incubation period which lasted in the experiments so far made 36 days as a maximum, 6 days as a minimum. In the attacks the temperature very often rose to between 40–41° C.

It began in typical manner with rigor and ended with outbreak of sweating. But already in the stage of incubation before the first typical malarial attacks there appeared moderate elevation of temperature in most cases in irregular sequence, or often indeed according to the tertian type, these manifestations of fever being connected with no noteworthy discomfort, still less with rigor and sweating.

In few cases was the inoculation without result, and often then a second inoculation was successful. Still we have to record a few cases which remained refractory with three or four inoculations, even when larger quantities of blood from two patients with fever were given at the same time. It seems, therefore, that there are individuals who are immune to tertian malaria, at least in the form of this inoculated malaria.

The course of the attack was a very variable one. Cases in which the attacks of the tertian type remained during the entire course of the treatment were in the minority. Frequently the attacks which began as tertian soon passed over into a quotidian type, or from the beginning the fever set in as quotidian, eventually to proceed as tertian. Not infrequently the attacks ceased spon-

taneously after some had run their course, appearing again afresh after some days without fever. If the attacks were delayed too long a fresh attempt was made to call them forth by some means of provocation, the best of which proved itself to be a subcutaneous injection of nucleinate of sodium, which usually succeeded.

As a rule I permitted the patients to pass through eight or nine attacks. Only in cases which tolerated the fever very well did I wait for 10–12 attacks. Then the malaria was checked by quinin treatment, the patients receiving for three days, twice a day, 0.5, and for 14 days, once a day, 0.5 quinin bisulphate. Often an attenuated attack of fever still appeared on the first day of the treatment by quinine. Usually, however, the patients remained completely free from fever from the first day of quinine on. Beside the treatment by quinine and continued beyond this the patients received also neo-salvarsan injections intravenously and as a rule six injections in doses of 0.3, 0.45, 4 x 0.6, at one week intervals.

This inoculated malaria showed itself much more sensitive toward quinine than the natural malaria caused by the sting of the anopheles. The plasmodia disappeared completely from the blood after the first effective dose of quinine, as we could often convince ourselves. Recovery from the malaria was always complete. The fever could never afterward be called forth by provocative means, and in no case has there been so far a return of malaria. The mildness of this inoculation malaria may be explained thus, that the plasmodia which always reproduce themselves only in the asexual way are less capable of resistance. Further, one finds abundant plasmodia in the blood of our paretics with fever but only few gametes. Dr. Busson of the Serotherapeutic Institute was also of the impression on examining the blood of our patients that their plasmodia carry much less pigment than the plasmodia of the anopheles malaria. Perhaps also something is to be attributed to the fact that the plasmodia of our stock had no opportunity to form a defense against quinin before their transmission. The case from which our stock arose had never had quinine before the obtaining of the inoculating material. And the further inoculation was of course always carried out before the patient had had quinine.

I gave attention, therefore, to a second stock which we introduced in the clinic. The blood should come from a malarial patient not yet treated with quinine. I recommend that weight should be laid likewise upon this factor in following these experiments. The results of this treatment were the best that I had ever seen up to

that time in any treatment of general paresis. In cases in which the disease is not of long duration one can predict with a fair degree of certainty that there will be complete remission. This comes to pass chiefly where the illness is of a not too long duration, less often where the disease picture is a severe one. We have seen complete remissions not only in cases of beginning dementia but also in states of severe maniacal excitement with delusions of grandeur and delirium as well as in paralytic attacks.

Complete remission occurred in more than 50 of the paretics selected for treatment so far. They were not only capable of taking up their occupations but for the most part are actually at work at their former calling. This result is so much the more gratifying since so far a return of the condition has not occurred in a single one of these completely remitted cases. It may also be pointed out in regard to the durability of these remissions that all three paretics from the year 1917 of whom we spoke earlier still today, that is after more than four years, are at work in their calling without any hindrance.

The maximum of the improvement does not manifest itself at once at the end of the period of fever but does later. On the contrary the improvement continues often for a long period so that in many cases the result seemed to be an incomplete one where later however a complete remission came to pass. A striking improvement of the general condition is ushered in in most cases at the same time that the symptoms of the paretic disease recede. This shows itself in increase in weight, blooming complexion, feeling of health. It was established in some cases that a former diminished or obliterated potency had become normal again. Two symptoms may be specially mentioned among those by which the improvement through this treatment revealed itself, i.e., disturbances of speech and the epileptiform attacks. Even severe disturbances of speech have disappeared completely in the course of the treatment. And paretics who previously had frequent paralytic attacks became for the most part permanently free from these attacks even when the remission otherwise was not complete.

In rare cases it was evident that when the paresis was already of long standing and well advanced attacks of fever so weakened the patient that his condition seemed serious. In such cases the malaria was arrested earlier before the scheduled number of attacks of fever was reached. A striking fact however was that which we observed in this treatment as we had already met it previously in the treatment

with tuberculin and typhus vaccine. The treatment had only a negligible influence upon the serum and fluid reactions. The blood and C. S. F. Wassermann reaction was tested quantitatively in each case before treatment and at is completion. Further the globulin and general albumin content of the C. S. F. and the number of lymphocytes in the fluid were observed. Only in a few cases could there be established an influence upon the reactions worth mentioning. Particularly no distinction in this regard could be noticed between the cases in which the most complete remission had taken place and those in which every improvement was wanting. These reactions therefore have indeed a great diagnostic significance but no prognostic importance.

Treatment of general paresis by malaria according to my experience gives by far the most favorable results of all the methods of treatment of this disease. Unfortunately this can be carried out, at least up to the present, only under definite presupposed conditions. The malarial virus so far can not be cultivated outside the body and also can not be kept for a long time outside the body. So this treatment has to assume that some one suffering from malaria is on the spot where paretics are to be treated. This one difficulty it is true may be overcome by bringing a malarial patient to the place where paretics are to be treated or by bringing a paretic to the place where there are malarial patients. Besides when one has once inoculated a paretic one can inoculate other paretics from him and so establish a malarial stock and further cultivate it. But the latter presupposes again a large supply of paretics such as would be found only in psychiatric clinics in large cities or in large insane asylums. For otherwise the malaria is perhaps brought to recovery in the inoculated paretic before a further paretic appears for inoculation. The established stock perishes and so the difficulty begins again. Yet where the treatment by malaria can not be carried out one should still carry out the treatment with tuberculin-mercury or that with typhus vaccine-mercury. Above all one must see to it that the paretics are brought to treatment in the earliest stages possible. This is the most important condition upon which the result depends.

TREATMENT OF PARESIS BY INOCULATION WITH MALARIA

By Doctor Honorio F. Delgado
of Lima, Peru

Its increasing frequency and its inexorable advance constitute a reason for serious occupation on the part of the specialist with the subject of paresis, or dementia paralytica. This is without doubt the form of syphilis the treatment of which has been pursued with a tenacity comparable only to the fruitlessness of the results. It has been accepted up to the present time as an incontrovertible postulate that, with rare exceptions, it is a disease progressing to fatality, causing death in a period of from three to five years. It is of the greatest interest, therefore, to take into consideration a method of procedure fitted to modify the alarming prognostic formula which Leredde, an authority on the subject, announced in this way at a meeting of the Society of Medicine of Paris on the 23d of April of this year: "Paresis is the only form of nervous syphilis which opposes us *en bloc*."

A series of methods for the treatment of paresis has been tested in recent years, particularly in Germanic countries, the results of which are scarcely less discouraging than those obtained by the classic drugs, not excepting the sera and bolder methods. These recently tried methods are with silver arsfenamina, collargol, methylene blue, trypan blue, etc. It is not the same with the procedure based on the production of fever and leucocytosis, by the nucleinate of soda, tuberculin, chronic abscesses, and the introduction of streptococci and dead staphylococci and inoculation with malarial and recurrent fevers.

The results obtained recently by the inoculation of malaria and recurrent fever are extremely encouraging. For this reason I decided to put into practice in my service in the Colonial Asylum "Larco Herrera" (Magdalena), the method of inoculation with malaria, the only one satisfactory to me and perhaps the better one. The good results I make public perhaps prematurely, but for the very reason that a knowledge of them may stimulate new applications of the method.

Before presenting my observations I will consider it of advantage to review the special indications and speculations which I gather particularly from the fundamental work of the discoverer of this therapeutic method of procedure, Prof. Wagner von Jauregg, *Ueber die*

Wirkung der Malaria auf die progressive Paralyse, Psychiatrische-Neurologische Wochenschrift., Nrs. 21, 22, 1918, and from the more recent one of P. Muehlens, W. Weygandt and W. Kirschbaum, *Die Behandlung der Paralyse mit Malaria und Rekurrenzfieber,* Muen. med. Woch., 67, 1920, without neglecting the contents of other works which figure in the bibliographic report. Here are included as well the principal articles concerning the method of Rosenblum or that of the inoculation with recurrent fever.

The technic employed consists in inoculating the blood of the subjects to be made malarial with recognized germs of tertian fever or tropical malaria in quantity of half a cm. in the case of blood not previously defibrinated and as much as a cubic centimetre in case of defibrinated blood. The fever shows itself in the paretics inoculated at the end of a period from eight to thirteen days and yields easily to quinine, which is not administered before the seventh attack of fever. In some cases it has been permitted to produce as many as 16 attacks without any ill effects. After treatment with quinine neosalvarsan is used in increasing doses.

Wagner von Jauregg, through employment of this method, obtained the lasting cure of three cases of the first 9 inoculated, one case being observed for over three years. This does not include certain remissions or cures which he had seen before as a result of accidental intercurrent malarial infection.

Of the four paretics inoculated by R. Weichbrodt, two cases, the more recent, improved to the point of being able to leave the hospital. The other two more advanced suffered no modification in their progressive course.

Muehlens, Weygandt and Kirschbaum have inoculated 38 cases, 30 of them with positive result; 17 were inoculated with tertian fever, 12 with positive result, 12 with tropical malaria, 9 with positive result, and 9 with recurrent fever. They exclude 9 of the 30 in which positive results were obtained because they did not have sufficient time for observation. Of the remaining 21 cases, 7 were those receiving tertian fever, 8 tropical malaria and 6 recurrent fever. There were only 6 of the cases in which paresis was far advanced, the rest had developed it recently. Of the 21 mentioned four died from causes completely extraneous to the deliberate infection; 12 improved so far that their remission no longer left room for doubt, the subjects maintaining their ability to work, some with so much efficiency that they

could obtain promotion in their professions; 4 improved somewhat, and 1 only, the remaining one, experienced no change.

All experimenters are in agreement as to the time for instituting the treatment. It is the more efficacious the earlier in the beginning of the paresis it is given. It is also necessary to avoid subjects of advanced age, those who are weak and those in a bad physical condition, as with bed sores.

As regards the efficacious factor in this type of treatment, it would appear that leucocytosis ought to be excluded, because when caused by other agents it does not give results which can be compared with those obtained by means of the infections with the fevers mentioned. The majority of opinions inclines to favor the fever itself, the *elevated temperature*. The investigations of R. Weichbrodt and F. Jahnel give solid ground for this. They have obtained in effect the death of existing spirochetes in the chancres of rabbits inoculated with syphilis by means of exposure of these animals to a temperature of 42° C. to 43° C. in three intervals. They have also been able to bring about the elevation of the central temperature of these animals placed in a room heated to 41° C., bringing it up as far as 44° C. These authors are so convinced that the hyperthermia is the decisive factor that they advise the treatment of paretics should be tried in hot baths.

Plaut and Steiner, without denying the validity of the effect of high temperatures, believe in an influence of a biological order, for which reason they maintain the superiority of employing recurrent fever. According to them a closer biological relationship exists between the spirochete of recurrent fever, and that of syphilis (that between the hematozoa and this), the recurrent fever would give occasion for the production on the part of the organism of different substances, antibodies, which could have some injurious influence upon the *treponema pallidum*. Plaut and Steiner advocate this infection as preferable for this theoretic reason and because the fever due to recurrent fever is greater than that from the tertian organism, and also because it can be cured with neosalvarsan. The results of their first experiments are truly significant; of six advanced paretics, one was cured and two improved.

In continuation I submit my experiments in the matter, which have to do with five cases, four of paresis deliberately treated with malaria and one, probably of dementia precox, or of cerebral syphilis, infected accidentally with *plasmodium vivax*, who supplied the blood for the paretics. Four of these patients are in my service in the

asylum for the mentally diseased "Larco Herrera." Besides these cases I have inoculated successfully four other cases of paresis in the free service of the same asylum through the kind permission of the chief of this service, Dr. Sebastian Lorente. Only one of these cases had malaria, that is Case IV.

Case I.—The subject in which the treatment gave favorable results is C. A., 40 years old, of mixed race, a lawyer. In the first days of March, 1920, a month after being married, he began to show grave irregularities in conduct, wasted his money, wandered about the city and the country, more than once losing his hat, and he manifested emotional exaltation and ideas of grandeur. The incident of a gross forgery of a check for a thousand libras "for fees" which he signed and attempted to collect at the bank determined his family to intern him. At his entry into the asylum on March 19, 1920, he manifested euphoria, megalomania, dysarthria, dysgraphia, insufficient perception, very mobile attention, incoherence of ideas, confabulation, disorientation, loss of autocriticism, agitation; exaggerated reflexes, Romberg, Argyll-Robertson; Wassermann strongly positive in the blood and in the cerebrospinal fluid, lymphocytosis, albuminosis. The condition of the patient progressed, delusioned ideas of grandeur increased with irregular systematized elements. He was the descendant of the last Inca and of a great Spanish noble and possessed a fortune of several billions. He never ceased his financial and patriotic plans. His irritability and agitation showed periods of intense aggravation in which he destroyed all that he found within reach and attempted attacks upon everybody. The dysarthria grew rapidly worse.

Soon after his entrance general trembling commenced, vertigo and motor incoördination which at times interrupted his walking and even caused him to fall to the floor. Finally at the end of the same year nocturnal incontinence appeared, both urinary and fecal, the former being constant, the latter occasional. All this existed in spite of neosalvarsan, of mercury, of iodides, and of urotropin. In such a state, the 24th of February of this year, after having obtained the permission of his family, the same as was done in the other cases, he was injected subcutaneously with 1 cc. of malarial blood from Case V. Eleven days afterward, the 7th of March, he had his first attack of malaria, the *plasmodium vivax* being found in the blood. The temperature scarcely reached 38° C., although the subject felt very badly, complaining also of chills, severe pains in his bones and inability frequently to move his legs. On the 8th the temperature was 37.8° C., with the same symptoms and aggravated dysarthria. On the 9th it reached 38.5° C., with profound prostration, difficult respiration, urinary and fecal incontinence. On the 10th the temperature rose to 39.2° C., with the same symptoms, perhaps more intense, and besides heavy sweating, vomiting, tachycardia, 144 pulsations a minute, and arterial hypotension. We injected 10 cc. camphored oil. At the same time we administered digitalis. The following day the temper-

ature was only 37.9° C., with the condition generally improved. On the 11th the temperature did not exceed 37° C., with the general condition satisfactorily better, there being merely a moment of agitation with hallucinations when the patient leaped from his bed and attempted to run. Afterward his mental and physical states were somewhat better than before the inoculation.

Through the natural reaction of the organism, and perhaps under the influence of the oil which was injected daily in the dose indicated, the fever did not show itself again for several days. In homage to Wagner von Jauregg, I will mention the hypnagogic hallucination which the patient had on the 16th day, which he related to me, as it was impressed upon him, in the following terms: *"The inventor of the injection which was applied to me because of my illness presented himself to me. He was seated in his office in a chair profusely decorated. He was correctly dressed in a frock coat. . . . He had a gold watch chain, very fine. He was a German with a reddish mustache, without whiskers. He said to me, 'I have invented the injection which they have given you.' When I started to get up to show my gratitude the wise man disappeared."*

On the 28th of March the temperature rose again (38.4° C.), without other symptoms than chills and general discomfort. Again on the 29th 37.3° C. and the 30th 39.2° C. At this time the delusional ideas increased notably, also the disorientation and in a lesser degree the irritability and the dysarthria. The incontinence had disappeared. In April he had four distinct attacks of fever, the 1st 37.8° C., the 5th 37.4° C., the 17th 38° C. and the 19th 37.6° C. The 11th of May 2 cc. of blood were injected also from Case V. The 29th of the same month a new injection was made because the fever had not appeared. On June 1 there was an elevation of temperature 37.4° C., again on the 2d 37.5° C., and the 3d 40° C., with violent chills and excessively copious perspiration. With this attack the malaria spontaneously retreated to return no more.

The remainder of the state of this patient June 16 of the present year is as follows: His general physical state has improved notably, having increased in weight more than 2 kilos. He weighed 59 kilos before the inoculation and 61.3 at the time indicated. His movements are perfectly coördinated, since he can walk, run and dance without difficulty. Romberg is absent, patellar reflex is normal, pupillary reflex to light is scarcely perceptible, insignificant; there is mydriasis. Speech is normal even when the subject is very emotional. The writing is normal. As regards the mental state the facts are even more flattering. The subject not only has actually perfectly normal perception of reality, but, furthermore, he can give a clear account of his own errors in the period passed through. He recognizes how false have been his delusional ideas. His capacity for mental work, determined by respective "tests," corresponds to normal mentality, being superior to the average in the velocity with which he makes arithmetical calculations. The serological data disagree sufficiently with the psychological; cerebrospinal fluid, Wassermann ++++, lymphocytes 8 in 3 mm., albumin 0.520.

C. A. left the asylum in this condition July 21 after having been injected with a complete series of neosalvarsan and 21 injections of biyoduro of mercury. From that time to the present he has conducted himself perfectly normally at home and on the street. His trophic condition has improved even more, he has become sufficiently fat. The only thing of which he complains is copious sweating. An analysis of the cerebrospinal fluid, made September 3, showed the following surprising result: Wassermann ++++ and in the blood Wassermann +++.

To resume, there is here a complete remission, except for the signs of syphilis, in this case of paresis which had developed rapidly in the course of a year with very grave organic and mental symptoms. The remission has occurred after 15 malarial attacks of which in three alone the temperature exceeded 39° where indeed a great organic reaction was evident.

Case II.—A. L., male, 34 years old, white race, married, occupation commercial, of moderate economic and social condition. In 1914 the family noticed a marked change in his character which persisted. From being docile and affectionate he became violent. He went so far as to attempt to assault his mother. Furthermore he believed himself very rich refusing on this account to work. There were not wanting other strange ideas. At this same time he had an "attack" which deprived him of the use of speech. The family tell also of other later attacks of the nature and the time of which they give nothing definite except that they indeed recall that these attacks were preceded by certain "fevers" equally ill defined. In spite of all this A. L. was working fairly well up to the end of 1919. At that time the heads of his office began to complain of his serious instances of carelessness and his errors. In the early months of 1920 his mental state was abnormally exaggerated, becoming gradually worse until his entrance into the asylum, which was October 26 of the same year. He passed to my service a week later. His condition at that time was one of complete disorientation endo- and allopsychic, psychomotor agitation, delusional ideas of grandeur, illusions and visual and auditory hallucinations, euphoria, incessant verbigeration, incongruous mimicry, dysarthria, insecurity and trembling of the limbs to such a degree that he could neither walk nor lift his food to his mouth. There were present dysgraphia, mechanical and psychic, much accentuated, urinary and fecal incontinence, inequality of pupils, miosis, Argyll-Robertson, cerebrospinal fluid, Wassermann +-|-++, slight hyperalbuminosis, slight lymphocytosis. In spite of the intense antisyphilitic treatment the condition of the patient, prostrate in bed, up to the time when he was inoculated with malaria, was unchanged in its severity except that the delusional ideas and the verbigeration became accentuated. The former became systematized about the ideas of possession of fabulous riches and of having whatever he wanted by murdering and of the infidelity of his wife. The verbigeration was incessant and in a high pitched voice so that he became the roughest patient in the pavilion. The urinary incontinence persisted, the fecal was episodic.

February 24 of the present year he was inoculated with a cubic centimeter of malarial blood according to the same procedure as that in Case I. From the 28th of the same month to the 4th of the following month very slight elevations of temperature occurred, reaching at the highest, 37.5° C. without having found any hematozoa in the blood. March 10 the temperature did mount up to 39.1° C. but without chills and the patient did not complain of feeling badly. The same thing was observed in the successive attacks. After eleven attacks, in the majority more than 39° C. one of 40° C. and the other of 40.2° C. the patient gave evidence of weakness, paleness, prostration, diminution of appetite. He who before had eaten everything with the greed of an animal began to be particular. There appeared also the beginning of a scar on the right buttock. There appeared on the other hand favorable changes in the mental state, diminution of the verbigeration, of the agitation and of the incontinence. The weakness made it necessary to inject 10 cc. of the camphored oil which had the same effect as in Case I, it arrested the malarial attacks. April 7 the incontinence disappeared and the 13th of the same month the patient already had sufficient ability for concentration to read reviews. Marked dysarthria still was noted. The state of delirium had diminished considerably and although the ideas of grandeur still persisted they expressed themselves less emphatically and with a discreet mimicry. The patient appeared improved however in this respect in the last days of April after new but moderate elevations of temperature. When he got up he could not stand on his feet. His nights were good, he slept without interruption. From May 5 he was able to get up every day without showing any resistance. From the 7th of the month he walked unsteadily but without having to have assistance when he started off.

His condition however left much to be desired, since he was disoriented in all his sense perceptions, talkative delirium, yet in a low voice and not continually, had difficulty in walking with trembling. He was inoculated therefore with fresh malarial blood May 11 in the proportion of 2 cubic centimeters. No rise of temperature occurred up to the 29th of this month so he was inoculated once more with malarial blood. The following day he had fever 40.2° C. and there were chills and incontinence of urine. From this time to June 9 there appeared every afternoon an attack of fever with a temperature generally greater than 40° C. reaching one day 40.6° C. and with the same lesser symptoms, chills and incontinence, without unfavorable effect upon the general state of the patient, as the fact showed that his strength was sufficient to pass through these attacks without going to bed. The fever continued to appear every day, although less intense, until June 14, at which time a slight edema showed itself in the legs for which 1 gr. of bichloride of quinine was injected. The last attack appeared two hours after the injection in which the temperature reached 40.8° C. with an insignificant amount of perspiration and without chills.

The further condition of the subject, June 16, was as follows. His movements were well coördinated, he being able to walk with relative ease. He became unsteady only when he was emotionally excited which is rare with him. The pupils did not react to light and there was miosis and trembling in the face when he spoke. There was slight dysarthria on rare occasions. He retained his ideas of grandeur but did not now express them spontaneously. It was necessary to excite him deliberately before he would speak of his riches and he did it with tranquility and without raising the tone of his voice. He continued disoriented but at times he had marked critical ability. Thus, for example, when he was asked to take the attitude necessary for verifying the sign of Romberg and when he was asked to walk rapidly and to turn in the middle he said he was not a marionette. He performed simple arithmetical operations without committing an error in the majority of the cases. A scarcely perceptible dysgraphia was present but not constantly. His affective state is more quiet so that he can be called the most quiet patient on the pavilion. The biological reactions are as follow, Wassermann in the blood +++, Wassermann in the cerebrospinal fluid ++++, lymphocytes 4 in 3 mm.; albumin 0.310.

His condition has not varied from that time, June 16, to the present, except the anemia which has disappeared and the weight which has notably increased. A series of intravenous injections have been given of neosalvarsan and mercury with the administration also of iodides and urotropin.

In resuming this case it is to be noted that its beginning was in 1914 and its condition was sufficiently grave and well established at the time of entrance into the asylum, October, 1920. From this time the patient was prostrated in bed and suffering incontinence, and he was the most violent patient in the pavilion. After 32 attacks of malaria with very high temperature and with little reaction upon his general condition, the remission of the gravest symptoms was observed, intense and lasting psychomotor agitation, verbigeration, incapacity for coördinated movements, absolute indocility, involuntary discharges. He changed from being the most difficult patient of the pavilion to the most quiet.

Case III.—L. G., male, 41 years old, married, white race, wealthy merchant. From the beginning of 1920, without being able to define the exact time, he began to commit extravagant acts to such a degree that the pathological nature of these acts became evident to his family. They had recourse to the services of a professional man in August of that year. The patient showed at that time at examination very slight pupillary reaction to light, marked ataxia, static and kinetic, dysarthria, very marked trembling of the hands, ideas of grandeur. Cerebrospinal fluid showed Wassermann strongly positive, hyperlymphocytosis, hyperglobulinosis. After being treated with binodide of mercury the subject experienced improvement. The treatment did not continue since the patient passed into the hands of another physician who treated him as if he were

merely a victim of a lesion in the prostate. He grew worse under that to such a degree that in February of the present year, after having attempted agressive attacks in the house and on the street, he suffered an apoplectic attack which according to the family's statement was very serious with great elevation of temperature. He entered the asylum a few days after the attack in a state of coma, with arhythmic pulse but with fever 38° C. His physical condition was lamentable; in his whole body could be seen traces of negligence and violent struggle, ecchymoses, excoriations and scars. When he came out of his comatose state and his previous phase of confusion, trembling on the right side of the body a delusional stage developed of terrifying content, with great verbigeration culminating in a grand psychomotor agitation with but little rest. There were hallucinations and illusions of vision and of hearing, dysarthria and at times anarthria, scanning speech, inability to hold himself upon his feet, fecal and urinary incontinence, inequality of the pupils, difficulty in swallowing.

The state of the patient continued thus, with little alteration after having been the object of an intense antisyphilitic treatment. This was successful in curing the cutaneous lesions except a scar of a growth that could not be removed. On May 11 2 cc. of malarial blood were injected after having obtained the sanction of the family, having informed them of the desperate condition of the patient. On the 21st of the same month he experienced his first attack of fever, discreet 37.6° C. It repeated itself 38° C. on the 22d and so on the 23d 37.6° C. There was no noteworthy organic reaction in any of these attacks. There was fever again on the 26th after two days of absence, and it was now high 40.2° C. with violent chills. There were two daily elevations in temperature from this time until June 4, the date when the attacks spontaneously ceased. The majority of these exceeded 39° C. and some 40° C. Improvement in the mental condition was noted after the first attacks. The patient grew quiet enough; the verbigeration, less tenacious, was in a low voice. The ideas of persecution and the aggressive attacks disappeared. Antimalarial treatment was instituted, as well as a tonic regimen, June 7, in spite of the fact that the attacks had spontaneously receded, in view of the subject's anemia and of the fact that the infected sore had made rapid progress. Notwithstanding this the organic condition grew so much worse that on the 12th of the same month the patient died.

To review, improvement of the mental state could be observed after the first attacks in this case in which malaria was inoculated into a paretic with a sore, contrary to the expressed indication of the German authors. It is very possible that the malaria, weakening the organism, hastened the death of the patient which by every likelihood would have taken place in a short time.

Case IV.—E. V., male, 27 years old, mixed race, single, of moderate education, collector of fares on an urban railway in Lima. Jovial in character and of ready intelligence. He had a chancre in

August, 1918, which was cured locally without treatment for syphilis. In November, 1919, he experienced a severe vertigo, fallig to the floor and having to remain several minutes on the couch because he could not stand on his feet. A notable change revealed itself in his character starting from this time. He became very irritable. In 1920 a deficiency in his intelligence was noticed also; his chiefs and his companions said that he had "become a simpleton." His ability had so far deteriorated that in November, 1920, his chiefs dismissed him for his incapacity in the discharge of his simple duties as collector of fares. The subject could not give account of his decline; on the contrary he believed that the reproaches of which he was the object on account of his carelessness and stupidity were unjust and he was irritated by the indications of his companions and the admonitions of his chiefs. He gave himself over to vagrancy and to drink on being discharged from the railway company, consuming large quantities of alcoholic drinks. There was evident even at this very same time a marked trembling of the hands, unsteadiness in walking, which appeared periodically, difficulty in speech and deterioration in the handwriting. He already believed himself rich, possessor of many houses.

He entered the asylum January 18, 1921, in a state of great malnutrition, quiet, indifferent and badly adapted to everything about him, in a semiconfusional state, manifesting in his conduct clear traits of a mental infantilism, egotism, euphoria, confabulation, well-defined ideas of grandeur, hypermimesis at times, agripnia, amnesia, dysarthria, dysgraphia, insecurity in walking, fibrillary trembling in the extremities, fatigable visual perception, Argyll-Robertson. The Wassermann was strongly positive in the cerebrospinal fluid and negative in the blood. Shortly after his entrance he fell into a stuporous condition which lasted a short time, recurring for brief periods.

An active treatment with enesol, neosalvarsan and iodides, continued from his entrance to the month of May, improved his condition. His symptoms at this time were as follows: The reflexes were slightly augmented, there was inequality of the pupils, Argyll-Robertson, slight dysarthria, dysgraphia, hypermimia, dullness of perception, disprosexia, impairment of judgment and critical ability, affective indifference, abulia, irritability. These were the symptoms present May 29, 1921, at the time when 2 cc. of malarial blood, *plasmodium vivax*, were inoculated into him. The first attack of malaria appeared June 16 (39.5° C.), repeating itself daily until the 28th of that month, when the attacks ceased with an injection of neosalvarsan. There were thirteen attacks, two of 41° C., one of 40.4° C., one of 40° C., a fourth of 39° C. and over; the rest were between 38° C. and 39° C. The attacks were accompanied by abundant sweating, being preceded by chills of moderate intensity. A depression of strength in the subject and a marked anemia were noted after the first attacks. The mental condition improved parallel with the attacks except the dysarthria, which diminished only with the last attacks, and the neurological signs, some of which have persisted.

After the malaria had ceased the condition of E. V. was one of

almost complete cure, particularly from the point of view of his mental state. The condition of the pupil had not changed, pupillary irregularity, Argyll-Robertson remained. There was slight hyperreflectivity in the limbs, though he walked securely, and the same thing with all his movements even when he made them rapidly. He could express himself well in writing as well as phonetically. His expression in writing is good as it is in speech except at certain rare occasions when he is submitted to difficult tests which increase his emotion at the same time. Imitation is normal, so is his perception. Attention shows slight inclination to fatigue. Mental elaboration alone presents some defect, a very slight carelessness in construction just as there is also a little diminution in the critical capacity. The sensations have revived with complete normality. The will leaves nothing to be desired, as also the capacity for work both mental and physical, as far as his education and his previous training go. Wassermann strongly positive ++++ in the cerebrospinal fluid and weakly positive + in the blood.

The subject worked in the asylum from June with perfect efficiency and without any loss in his mental condition and with improvement in his physical state, gaining some kilos in weight. He complained only of copious sweating as did Case I. The subject, who left the asylum September 5, has actually been reinstated in his position of collecting fares in the railway company of Lima.

A review of Case IV shows an illness of more than a year with grave symptoms at the time of the inoculation, although an improvement in some of them had been previously experienced. After thirteen attacks of malaria, the greater part of them with high temperature and moderate biological reaction, he finds himself cured of paresis, which has left slight traces of defect in the mental sphere and some of little practical importance in the physical, Argyll-Robertson, slight hyperreflectivity. He is fitted to work at the same occupation which he had before becoming ill.

Case V.—This case is that of a subject who was a victim of a psychosis separate from paresis who accidentally contracted malaria and who furnished the necessary blood for the inoculation of the cases previously reported. We include him in the present article because in his cure no other apparent agent intervened than the malaria which he had contracted at his entrance to the asylum.

J. A., male, 35 years old, married, of mixed race, carpenter. Quiet in character, affectionate, modest and industrious, of moderate intelligence and moral in conduct. He had no hereditary antecedent worthy of mention. He had one or more chancres in 1914, the nature of which was not precisely known, and which he himself treated by empirical means. There were no traces on examination. The beginning of his mental illness could not be well discovered, because it had been insidious and escaped the observation of the family, who were very ignorant. It appears that at the end of 1920 his manner of life changed and in the first months of the present year his conduct became openly pathological. The few confused data which could be

obtained permit one merely to know that in March of this year his lack of adaptation to reality was so great that not only was he unable to work, but his family could not tolerate him.

He entered the asylum April 14. He showed at that time in the pavilion of admission the following symptoms: complete disorientation in respect to time, place and persons, indifference, depression, disprosexia, bradylalia, amnesia, agrypnia and incontinence. He remained almost stationary in this condition until May 1 when he had an attack of malaria with 40° C. temperature, another on the third (39° C.). He was treated with quinine after the first attack. May 4 he passed into my service showing the symptoms before mentioned, except the incontinence and the agrypnia, which had disappeared. He manifested a desire to go walking and demanded his hat. Nothing particular was noted until the 7th day, when chills appeared and he complained of pain in his bones and his head. Perhaps the 5th day there was an attack of malaria which was not recognized, because the data had not yet been sent in from the admission pavilion. He showed a temperature of 40° C. After this attack a great mental improvement was noted. He who up to the moment of the attack had been completely incoherent showed lucidity. His improvement increased from this time. The following day he explained his slowness in walking. It appeared that the entire left side felt as if asleep. On the 9th the temperature rose again (40° C.), with chills and very pronounced discomfort. In view of the improvement in the patient from his entrance into my service no treatment was employed and the fever appeared unexpectedly. Its agent, *plasmodium vivax*, was at once determined at the diagnostic clinic. The appearance of the fever led me to hope for its curative power and kept me from using quinine. There was no more fever in spite of this after the attack on May 9 until the 23d of the same month. The patient's condition at that time was one of perfect mental adaptation with clear understanding of the transformation which he had undergone. Only his speech and his walking continued slow, although less so than before. The last two attacks were the one of May 25 and that of June 10. After the first mentioned he was given an injection of camphored oil (*aceite alcanforado*) for testing afresh, with success, if this agent is able to interrupt the malarial attacks.

He was already completely sound mentally, so he was treated with strychnine and massage, by means of which the numbness of the left side and the slowness in walking disappeared, the last residue of his illness. He left on the 17th of August completely well, having worked for several weeks at the asylum.

We must not neglect to point out that this patient, April 30, showed a weakly positive Wasserman reaction in the cerebrospinal fluid ++ 20 lymphocytes to the cubic millimeter and 0.420 of albumin. But on July 2 the analysis of the cerebrospinal fluid disclosed the following facts: Wassermann negative —, lymphocytes 9 to the cubic millimeter, albumin 0.220, urea 0.257, glucose 0.700 and in the blood Wassermann negative —. Later, when the reaction was again

tested, the Wassermann continued negative in the blood and in the cerebrospinal fluid.

To review, here is a case of psychosis of uncertain diagnosis, the cause of which could not be precisely determined, having developed for several months, which begins to remit remarkably after the first malarial attacks without any other treatment. The cure is completed after seven attacks, more or less, accompanied by regular organic reaction.

The remission of paresis by the inoculation of malaria constitutes practical proof that the possibility of mental rehabilitation even in advanced cases is in no way excluded. This is the same as the cerebral restitution, or compensation, according to Spielmayer and Weichbrodt, on anatomical grounds. Theoretically and practically, then, there is foundation for an optimistic position upon the subject of the prognosis of paresis.

On the other hand, we know that the clinical remission of paresis is not accompanied by remission of the serological signs of syphilis. This does not prohibit the very favorable character of the prognosis and it is not impossible to obtain an attenuation of these same residual symptoms as Schmelcher, in *Muenchener medizinische Wochenschrift,* Mar. 11, 1921, has been able to do with the employment of repeated and intensive doses of silver salvarsan.

I will terminate this article, which has perhaps been too much extended, in bringing forward some of my observations. I believe they may have some value, even if there is repetition in the greater number of cases, for the understanding of the vicissitudes in the treatment and for the possible discrimination of the factors which intervene during the cure. I will mention finally a curative method analogous to that of Wagner von Jauregg, employed since ancient times in a locality in Peru. I refer to the treatment of the "uta" [leishmaniosis of the skin and the mucous membranes] by malaria at a place called "Tembladera." It is called so, without doubt, because there malaria is endemic and general. The patients with uta come together at Tembladera from various villages of the department of Cajamarca, especially from the capital, from which periodically veritable caravans start out. There is a tradition, apparently well founded, according to which after a number of malarial attacks the leishmaniosis lesion cicatrizes and is cured. It suggests the fact of the zoölogical relationship between leishmania and the spirochete of syphilis. In leishmaniosis salvarsan is a curative agent as efficacious as in syphilis.

Condition of Patients on January 9, 1922.

Case I remains completely well; is about to be appointed a public official; continues entire antisyphilitic treatment. It has not been possible to make new serological tests.

Case II has again spontaneously developed megalomania and verbigeration, but in moderate degree. He has been again inoculated with malaria and has had four attacks.

Case IV remains in good condition and continues at work. Serological tests made on October 29, 1921, gave the following very encouraging result: Blood, Wassermann—negative; cerebrospinal fluid, Wassermann—negative; albumin, 0.200 gram per liter; lymphocytes, 3 per cubic mm.

Case V. No news, which would indicate that he is still in good condition.

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LIMA, September 9, 1921.

Dr. Delgado's paper is accompanied by a series of fever charts. As the movement of the temperature has been described in the body of the paper these have been omitted.

Society Proceedings

ASSOCIATION FOR RESEARCH IN NERVOUS AND MENTAL DISEASES

This Association held its second annual meeting at the Hotel Commodore, New York City, under the Presidency of Dr. Walter Timme, Dec. 28, 29, 1921. The subject under discussion was Multiple Sclerosis. The following was the program:

An Investigation of Multiple Sclerosis

Presidential address, Historical Retrospect, Walter Timme; The Symptomatology and Differential Diagnosis of Multiple Scerosis, Bernard Sachs in association with E. D. Friedman; Special Symptomatology Studies, J. W. McConnell, Wm. G. Cadwalader, George H. Wilson; The Locations of Lesions with Respect to Symptoms, E. W. Taylor; The Spinal Fluid in Multiple Sclerosis, James B. Ayer, Harold E. Foster; Aural and Vestibular Manifestations, Isidore Friesner; Ocular Manifestations, Ward A. Holden; Mental Symptoms in Multiple Sclerosis, Sanger Brown, 2d, T. K. Davis; Psychological Factors, Smith Ely Jelliffe; Clinical Endocrine Studies, Walter M. Kraus, Irving H. Pardee; Exogenous Causes of Multiple Sclerosis, L. F. Barker; Bacteriological Studies in the Pathogenesis of Multiple Sclerosis, Oscar Teague; Pathological Studies in the Pathogenesis of Multiple Sclerosis, George B. Hassin; Endocrine Studies, Macroscopical and Microscopical, Myrtelle M. Canavan, Hubert S. Howe; Projectoscope Demonstration of Material, Wm. G. Spiller; The Axis Cylinder in Multiple Sclerosis, J. H. Leiner; Ecology, Chas. L. Dana; Multiple Sclerosis as Revealed by the Draft, Pearce Bailey; Statistical Data, L. S. Wechsler; Geographical and Ethnological Features, C. B. Davenport, C. B. Esterbrook.

PRESIDENTIAL ADDRESS

In his opening address Dr. Walter Timme gave a brief historical retrospect of multiple sclerosis. Spinal cord physiology was a subject somewhat known to the ancients and paralysis due to cord injury has been known for some time. Galen seemed to have been one of the first to have appreciated the relation between local cord injury and loss of motor function. Apparently little was done from Galen's time to the Middle Ages, and not until the days of Bichat and Le Gallois did the definite relation between sensation and motion and spinal cord function become established. Timme then takes up

the specific problem of Carswell's early drawings and Cruveilhier's early observations. Later Frerichs developed the situation, and a student of his, Valentiner, made a complete clinico-pathological analysis of a case out of which the present day multiple sclerosis arose. Rokitansky, Rindfleisch, Leyden, then pursued the subject from the pathological point of view, and finally Charcot with his well-known triad gave us the accepted syndrome which ruled for a number of years. Since his time advance has been made along greater differentiation, minuter analysis of symptoms and more intense anatomical investigation. He calls special attention to newer experimental work inaugurated chiefly by Bulloch, now Gye, which is thus far only in its initial stages.

GENERAL SYMPTOMATOLOGY AND DIFFERENTIAL DIAGNOSIS OF DISSEMINATED SCLEROSIS

By B. Sachs, M.D., in Association with E. D. Friedman, M.D.

The authors' views are based upon a study of 141 cases. Of these 91 were observed at Mount Sinai Hospital during a period of ten years, and 50 cases were studied at the Montefiore Home. The records of both institutions show that the disease is about one-half as common as Tabes Dorsalis and is one of the chronic diseases of the nervous system with which the general practitioner as well as the neurologist should be well acquainted. Of the 141 cases included in this series, 100 were between the ages of twenty and forty years.

In studying the signs and symptoms, the authors departed from the triad of symptoms which had been accepted for so many years as indicative of Multiple Sclerosis. The marked discrepancies between various writers of the present day as to the symptomatology of the disease led Doctor Sachs to construct a table of the signs and symptoms of the disease, based upon his own personal experience. The hospital records were studied carefully by Doctor Friedman, who has added the percentages as recorded in the table. It is well to note that the diagnostic importance of a symptom is not always to be measured by the frequency of its occurrence. "Unusual remissions" or "disturbance of vesical control" may be noted more frequently than "pallor of optic discs," and yet the diagnostic importance of the last is far greater than of the former.

The following table is the result of the authors' studies:

Signs and Symptoms of Multiple Sclerosis in the Order of Their Diagnostic Importance

Based upon the Study of 141 Cases

1. Easy fatigue, weakness and stiffness of one or both upper or lower extremities culminating in spastic paraplegia	81.7%
associated with	
(a) Increase of deep reflexes	90 %
(b) Postive Babinski sign	78.3%
2. Nystagmus, generally horizontal, slight at the beginning, gradually becoming more marked	70 %
3. Ataxic tremor of upper extremities and tremor of the head	55.3%

4. Marked diminution or loss of abdominal reflexes	83.7%
5. Spastic ataxic or ataxic gait and station (including the Romberg symptoms)	43.2%
6. Scanning speech or some form of dysarthria	36 %
7. Pallor of optic discs, especially of the temporal halves	32.6%
8. Disturbance in facial innervation, often very slight	32.6%
Deviation of tongue	10 %
Disturbance of deglutition	3.5%
9. Explosive laughter and emotional instability	17 %
10. Unusual remissions often leading to disappearance of symptoms	42 %
11. Transitory ocular palsies with diplopia	29 %
12. Vague objective and subjective sensory disturbances:	
(a) Objective (1) Posterior column disturbance	17 %
(2) Pain, touch and temperature disturbance	16.3%
(b) Subjective: Numbness, tingling and pain	30 %
13. Disturbance in vesical (not rectal) reflexes	40 %
(Hasty or delayed micturition; incontinence in 21 cases	14%
14. Tenderness of the spine, chiefly mid-dorsal	12 %
15. Dizziness (vestibular vertigo)	8¼%
16. Mental changes	15.6%
17. Auditory nerve involvement	2 %

Important Negative Signs and Symptoms

1. Pupils generally active with occasional hippus.
2. Biologic tests negative except for the occasional presence of globulin and slight increase in the number of cells in the spinal fluid in a few instances.

Colloidal gold curve reported as paretic by some writers. Not sufficiently studied in this series.

The authors conclude that the diagnosis of Multiple Sclerosis may safely be made if a number of the important symptoms enumerated in the preceding table are present and if the disease runs a subacute or chronic course.

The old triad of symptoms, or the one which Marburg has offered as a substitute, namely, afebrile course, multiplicity of foci and unusual remissions, is not sufficiently definite for diagnostic purposes. Hitherto the disease has been diagnosticated in its full-fledged form, whereas the attempt must be made to recognize it in its earliest stages.

The textbooks give a long list of diseases from which Multiple Sclerosis is to be differentiated, including Paralysis Agitans, Tumor of the brain and of the spinal cord, General Paresis, Hysteria and whatnot. But the authors insist that while the consideration of these may be left to the textbooks, there is only one differential diagnosis of paramount importance, and that is to determine in a given case whether the patient is suffering from Multiple Sclerosis or Multiple Cerebro-spinal Syphilis. In both diseases we are confronted with patients who have developed from very slight beginnings a more or less spastic weakness of the lower extremities associated with an increase of all the deep reflexes. In both diseases there are very marked periods of remission and of exacerbation.

In the cases of Lues Cerebro-spinalis there are pupillary symptoms and ocular palsies that point indubitably to the constitutional

infection, and there are in the majority of instances the positive biologic findings, the positive Wassermann reaction in the blood, the positive reaction in the spinal fluid, with the increase in globulin and in the number of cells.

In the cases of Disseminated Sclerosis, there are Nystagmus, transitory ocular pareses, the more or less marked intention tremor, as well as spastic contracture of the limbs.

It is of importance to note that in Disseminated Sclerosis the pupillary reactions are almost universally normal, whereas in fully 90 per cent of cases of Cerebro-spinal Lues the immobility of the pupils is a very early and a very constant symptom. The ocular palsies in Lues are early and complete; in Multiple Sclerosis they are partial and transitory. Moreover, in Disseminated Sclerosis the serological findings are practically negative; where in Cerebro-spinal Lues the findings are, as a rule, positive enough to confirm the diagnosis of Lues.

But the authors attach still greater significance to this striking fact—that the spasticity in Lues Cerebro-spinalis is greater than in the cases of Disseminated Sclerosis. In the earliest stages of the latter disease there is weakness and only a very slight degree of spasticity; in Lues Cerebro-spinalis there is marked spasticity and relatively less weakness.

Bearing all these facts in mind, the differential diagnosis can as a rule be safely established, but there are cases affording the greatest difficulty, because Disseminated Sclerosis may be developed in a patient suffering from constitutional Lues.

MULTIPLE SCLEROSIS. THE LOCATION OF LESIONS WITH RESPECT TO SYMPTOMS

E. W. Taylor, M.D.

The difficuly of properly coördinating lesions and symptoms in multiple sclerosis lies first in the fact that the pathological process spares the axones for a long period, and secondly, that the multiplicity of the lesions throughout the central nervous system confuses any attempt at accurate localization. In many cases the relation between lesions and symptoms is extremely vague and uncertain. In some cases definite lesions have produced no corresponding symptoms, and on the other hand, symptoms have not infrequently appeared unexplained post-mortem by focal lesions.

The originally described classical form of the disease occurs probably in not more than 15 per cent of the cases. Very much more frequent are the aberrent forms or the so-called *formes frustes*, as described by Charcot. An adequate explanation of the so-called cardinal symptoms is not altogether satisfactory. Presumably both the early loss of myelin and the location of lesions in the connecting tracts between the basal ganglia and the cerebellum, and including those ganglia, is the anatomical substratum of the incoördinations and tremors. As a possible explanation of the so-called cardinal

symptoms—nystagmus, volitional tremor, scanning speech and spasticity, with certain others frequently met with, as, for example, pallor of the temporal discs—Brouwer has advanced an hypothesis based on phylogenetic and ontogenetic studies of the nervous system in which he attempts to show that those portions of the nervous system latest developed are most prone to degenerative influences. He finds that the main symptoms of multiple sclerosis occur in the later developed tracts.

Considered from an anatomical standpoint, the question of correlation may be subdivided as follows: Lesions: 1. Cortex, centrum ovale. 2. Basal ganglia. 3. Cerebellum. 4. Optic system. 5. Brain stem and cranial nerves. 6. Cord.

A study of the mental changes in the disease and the accompanying anatomical lesions affords no adequate basis of correlation. The association of multiple sclerosis and syphilis is of considerable anatomic interest. The type of mental disintegration most commonly observed has been developed by Seiffer as a "polysclerotic dementia." A case reported by Dr. Solomon C. Fuller of combined dementia paralytica and multiple sclerosis is discussed at some length. Nothing of definite value is to be learned from a study of the basal ganglia and of the cerebellum in relation to the correlation of symptoms and lesions. It may be said, however, that lesions involving these portions of the brain are presumably productive of the more conspicuous and characteristic signs of the disease. The optic system has been carefully studied, beginning with the work of Uhtoff, and investigation here still further demonstrates the difficulty of adequate correlation. The brain stem and cranial nerves are frequently the seat of the lesions. The symptoms on the part of the cranial nerves rarely give evidence of the extent of the changes in pons and oblongata. Much confusion has existed in the differential diagnosis of various spinal cord affections and multiple sclerosis, especially of spastic conditions, myelitis and tumors.

Fourteen verified personal observations are briefly reported which serve to illustrate in concrete form difficulties of diagnosis and impossibility of accurate correlations. In but six of these cases was the diagnosis made before death. The others were confused with various other organic disturbances of the nervous system, notably of the spinal cord.

In general the following conclusions are reached. As in other structural diseases of the nervous system a general correlation may be made between lesions in certain localities and symptoms due to such lesions. It somewhat rarely happens that symptoms occur without discoverable lesions. The degree of disturbed function depends upon the age of the lesion. The loss of myelin presumably has some bearing on the peculiar motor destruction of the disease. This, taken with the localization of lesions in coördinating areas, may be regarded as responsible for the volitional tremor in its various aspects. Other signs and symptoms of the disease coextensive with the symptomatology of the nervous system in general find their explanation in the

multiplicity of the lesions, their localization and their degree of destructiveness. An attempt to draw accurate physiological deductions is usually fallacious and misleading.

STUDIES ON THE CEREBROSPINAL FLUID AND BLOOD IN MULTIPLE SCLEROSIS

James B. Ayer and Harold E. Foster, Boston

The analysis includes a study of 38 cases of multiple sclerosis in which the diagnosis seems assured, many of the patients having been observed over a considerable period of time. A number of doubtful cases were excluded from this study. Besides the routine examinations made upon the cerebrospinal fluid, certain fluid and blood analyses were made as a matter of research, designed to show possible metabolic disturbances.

It was found that a critical study of the fluid showed that when all tests were considered the spinal fluid was not usually negative, as is frequently stated, but that some deviation from normal was the rule. In 50 per cent of the cases the variation was marked, but depended not on one test but upon a correlation of all tests performed. The group of findings which the writers believe highly suggestive of multiple sclerosis because found by them rarely in other diseases is as follows: fluid under normal or low pressure as measured by the manometer, showing a few lymphocytes and arachnoidal mononuclears, rarely over 10 per cmm., total protein (quantitated) normal or slightly increased, "paretic" gold chloride reaction with a negative Wassermann.

A correlation of fluid findings and clinical evidence of the activity of the pathological process indicated that the fluids giving the above findings were from patients in whom the disease was apparently progressive; conversely, the negative or nearly normal fluids were found generally to come from patients in whom the disease had been long stationary.

Further analysis indicated that fluids from different loci of the subarachnoid space (cisterna magna and lumbar sac) showed similar findings. In patients, however, examined more than once, a striking variation in findings was seen, a change in character being noted in one case in fluids obtained less than a month apart.

The research studies on blood and spinal fluid included quantitative estimations on sugar, non-protein nitrogen, chlorides, creatinin, acetone bodies, urea and uric acid. No certain deviation from normal was made out.

AURAL AND VESTIBULAR MANIFESTATIONS

Isidore Friesner, M.D.

It would be exceedingly rash to dignify a discussion of the clinical data here presented by the term "conclusion," so much still rests on speculation and so little on definite knowledge. From these

examinations, however, there have sprung certain suggestions which are at least worthy of mention:

1. The usual type of spontaneous nystagmus (namely, rhythmic), combined with the fact that it is frequently not amenable to influences aroused by vestibular stimulation, suggests that the origin of the nystagmus is a lesion in the vestibulo-ocular mechanism.

2. It is certain that as the result of vestibular stimulation, nystagmus and vertigo and past pointing may at times be aroused independent of each other. This may be true not only of the static labyrinth as a whole, but may apply also to the individual canals, at least to the vertical canals, as differentiated from the horizontal. These facts suggest a difference in location between the vestibular nuclei or tracts which intermediate nystagmus impulses and those which have to do with the sense of position in space.

3. It appears, further, from Beck's cases, that nystagmus, vertigo and past pointing may be aroused by experimental vestibular stimulation, and yet the falling cannot be influenced by changes in the position of the head. This fact suggests a difference in the location of the vestibular nuclei or tracts that intermediate so-called vertigo impulses to the extremities and those which transmit similar impulses to the trunk.

4. The presence of induced nystagmus with the total loss or marked suppression of vertigo, as seen in Cases 5, 6, 7 and 9, suggests the possibility of extensive disease of the cerebellar nuclei, or of the cerebellocerebral tracts, as the cause of this phenomenon.

5. Finally, it is clear that careful study, combined with histologic research in cases of multiple sclerosis, will do much to clear up the shadows still overhanging an understanding of the anatomy and physiology of the central position of the vestibular apparatus.

THE OCULAR MANIFESTATIONS OF MULTIPLE SCLEROSIS

By Ward A. Holden, M.D., New York

The optic nerve symptoms of multiple sclerosis have long been known, and the chief advance in our knowledge of them recently has been in the greater precision in determining the defects in the visual field and in the earlier recognition that the symptoms are dependent upon the disseminated diseases of the central nervous system. But since the visual disturbances are sometimes the earliest symptoms to appear, the ophthalmologist whom the patient consults may be puzzled and the neurologist's later examination will not always confirm his tentative diagnosis.

The symptoms on which some insist as corroborative of the diagnosis of multiple sclerosis when a central scotoma is found are ankle clonus and the Babinski toe reflex. Yet diminished abdominal reflexes are found in multiple sclerosis as frequently as the Babinski reflex, namely, in about 80 per cent of cases. And we now have learned that if the other common causes of central scotoma can be

eliminated, diminution of abdominal reflexes warrants us in diagnosing multiple sclerosis, even if no other symptoms are present.

In the plaque the inflammatory exudation at first merely compresses the optic nerve fibers and interferes with their function. Later the medullary sheaths break down and the glia tissue proliferates, but since the axis cylinders are not destroyed, restitution of vision frequently takes place. In the beginning, if the inflammatory plaque lies near the optic disc, there may be congestion or a low degree of oedema of the disc, but if the plaque lies back in the nerve the disc for a time appears normal. However, after an interval, ranging from one to six weeks, pallor of the disc usually appears and remains permanently, even though vision is restored to normal again.

The pallor of the disc varies with the extent and location of the plaques and has been classified as of three varieties: (a) a pronounced whiteness of the disc in its entire extent; (b) a slight pallor of the disc in its entire extent, and (c) a pallor of the inferotemporal third of the disc with the other two thirds normal in color.

The first and second varieties—diffuse pallor—are found also in tabic and other general atrophies, while the third—temporal pallor—indicates an involvement of the axial bundle alone. This is the variety of pallor frequently found in multiple sclerosis, and it is, to a certain degree, characteristic of this disease. Furthermore, in some cases of multiple sclerosis pallor of the temporal half of the disc is found, while acuteness and field of vision are still normal. This suggests either that they may have been a slight involvement of the nerve which had not yet disturbed its function, or that there may have been earlier disturbances in the field of vision of which the patient had not been conscious and from which recovery had taken place. The appearance of the optic disc, therefore, has less diagnostic significance than the acuteness and the fields of vision.

The Fields of Vision.—The defective fields in multiple sclerosis are of three types: (a) peripheral contraction, (b) central or paracentral scotoma, and (c) a combination of both peripheral and central defects. Many observers find peripheral contractions with considerable frequency, but it is quite certain that in a number of these cases the defect is of functional rather than of organic nature. We have been accustomed to speak of a peripheral contraction, often increasing as the test continues, as a functional or fatigue fiend which is found in the neurasthenic or hysterical. The present-day interpretation of this fatigue field is that it is suggested by the examiner to a patient susceptible of suggestion. In multiple sclerosis the mental state of the patient is often one in which suggestions are readily seized upon. Hence, while at times there may be definite constant peripheral defects in the field, due to a lesion in the optic nerve, we yet view with suspicion records of a more or less uniform contraction of the entire periphery of the field and regard many of these contractions as being of a functional nature and suggested to the patient through defective technique in taking the field.

The more characteristic defects in the field are the central and

paracentral scotomata. In these cases again great care must be taken in the tests, which must be carried out quickly with very small test objects, for the patient soon becomes confused and his answers contradictory.

Course and Diagnosis.—The onset of the visual disturbance is acute in half the cases, and in a large percentage both eyes are affected. The maximum disturbance of vision may be reached in a few days and recovery may take place in an equal time. Again, the disturbance of vision may long remain stationary, then either improve or grow worse, and remissions, relapses and extensions may alternate for years. With a central scotoma the patient cannot read, but he cannot go without difficulty, and, unlike atrophies of the optic nerve of other origin, this variety never leads to blindness, and a reassuring prognosis may always be given.

When the visual disturbance is the first symptom noticed, and a central or paracentral scotoma develops within a few days without pallor of the disc, the differential diagnosis between multiple sclerosis and hysteria is often most difficult. The patient with multiple sclerosis may exhibit hysterical manifestations and an adequate psychic trauma may be discovered. The vision may improve slowly, or remain stationary, but after a lapse of weeks a pallor of the disc appears which confirms the diagnosis of organic disease.

MENTAL SYMPTOMS OF MULTIPLE SCLEROSIS

By Sanger Brown, 2d, M.D., and T. K. Davis, M.D.

Brown and Davis estimate that mental symptoms of some kind occur in at least 90 per cent of cases of multiple sclerosis. They include under mental symptoms certain emotional changes and euphoric states as well as frank psychoses.

They suggest that the mental symptoms of multiple sclerosis may be divided into two main categories, those which they term the primary symptoms, and the secondary symptoms.

In the primary group of symptoms they place the mental defect symptoms, such as memory defect, judgment defect and also euphoria.

In the secondary group of symptoms they place those conditions which they believe to be accidental or episodic in the course of the disease. Here they place states of depression, temporary paranoid states, delusional trends and similar non-organic reactions.

They believe these latter to be the result of the situation which the disease brings about, *i.e.*, helplessness, weakness, inability to work, etc.

They call particular attention to the way in which the mental symptoms change throughout the course of the disease. Deterioration often comes early. Euphoria is a very common symptom. The condition is not like other organic diseases to any great extent. It has only a superficial resemblance to paresis. Similar mental states

are seen in brain tumor. There are few toxic mental symptoms with delirium. At least this is very infrequent, such as is seen in pellagra.

They were unable to find any correlation between the extent or the location of the lesion and the character of the mental symptoms. They could find nothing in the personality of their patients which predisposed them to mental symptoms. They cite a number of case histories illustrating their clinical observations.

EMOTIONAL AND PSYCHOLOGICAL FACTORS IN MULTIPLE SCLEROSIS

SMITH ELY JELLIFFE, M.D.

In this discussion Dr. Jelliffe develops two issues: 1. He first considers the prevalence of neurotic and psychotic disturbances in patients who show the usual somatic sensori-motor disturbances of what is usually termed multiple sclerosis, irrespective of the etiological factors. In this section of the discussion of the emotional and psychological factors, multiple sclerosis is but a general convenient label for a whole group of syndromes which more closely conform clinically to a pure abstraction, the diagnosis, "Multiple Sclerosis."

Such neurotic and psychotic disturbances, in this section, viewed from the psychological aspect, are dealt with from two points of view: (a) Those which are due so far as analyzable to problems connected with the location of plaques in different parts of the nervous system, independent of the pathological nature of the plaques, the psychological symptoms are discussed purely from the standpoint of the localization of the offending focal lesions. Localizations of plaques within the zones of language produce characteristic aphasic problems of a vast variety too detailed to be entered into. Those of the frontal lobes produce some very characteristic mental pictures. Memory losses, witzelsucht, confusions, etc. Similarly, midbrain involvements cause a variety of emotional dyskinesias as seen in the explosive laughter, crying, etc. Other strictly localizable disturbances of gestures, mimesis, or other type of symbolic expression, from lowest to highest stages of expressions, are discussed briefly.

Dr. Jelliffe then considers a second type (b) of psychological reaction, which by insensible degrees is correlated with the second main topic of his theme. In one sense it is separated only with difficulty from it: What are the compensating psychological manifestations which the patient builds up in the face of disease which, according to the intellectual or intuitive grade of development of the patient, is recognized, sooner or later, as chronic, progressive, disabling and may be fatal? What are the psychological attitudes which grow up in a vast kaleidoscopic mosaic-like series of reactions made possible as compensations for ills, or well-defined disturbances of more or less important functions?

One sees types of hallucinatory prowess in the sexual sphere in

patients who have had plaques preventing the penis erection, or, *vice versa,* some interesting observations of ideas of sinfulness in compensation for persistent priapism from cervico-dorsal localizations of plaques. Plaques cutting off bladder automatisms are responded to frequently with great irritability and restlessness and fussiness. Some women patients with periodic bladder disturbances drive their environment to distraction in their constant exasperation connected with impaired bladder function.

Muscle power loss may be reacted to in a great regression to psychological helplessness. These patients may always demand amusement. They look for new friends in every face. They live on being mothered or fathered. They must have comfort, if wealthy; and when poor, despair may be the reaction. A light debonair air of cheerfulness is frequent in many. They whistle, as it were, to keep their courage up. Or, again, alcohol and drugs are the means taken to exclude reality. Alcohol seems greatly shunned, however, as it works such speedy loss of power, long before its psychological blessings are conferred. This is an interesting problem of a pharmacological and pathological correlation.

In an ingenious manner, Brouwer has shown how in some types of multiple sclerosis the newest accessions of neurological function fall down before the pathological process much earlier than the phylogenetically older functions. This also is known to be a general law in the pharmacological action of alcohol; thus, by a process of summation of similars, a much greater functional loss is found following even the most minute alcohol dosage. Nevertheless, the flight into alcohol sometimes is quite a marked symptom. Its underlying relations to a progressively arrived at suicide is of far-reaching psychological importance.

Other types of psychological adjustments to specific losses are instanced in the paper.

II. Under the second theme Jelliffe passes to an entirely new series of considerations. He goes over from a discussion of psychological situations as results of the variety of pathological factors which clinically result in a multiple sclerosis picture to an entirely new series of suggestions.

These must be very sharply differentiated from the others. He now asks a question whether psychological factors may not be conceived of the *cause,* not of "multiple sclerosis," as some ignorant or malicious critics have implied, but as playing an important and determining rôle in some special types of multiple sclerosis. From the foregoing discussion it is revealed that he first regards our clinical concept of multiple sclerosis as a syndromy. It has steadily achieved greater and greater precision, and analytic research from the days of Vulpian, Charcot, Gilles de la Tourette, Valentiner and the workers between 1852 and the present time is showing what a multiplicity of factors are playing a dance of variable importance, as we attempt a synthesis of this or another trend. Thus the syphilitic encephalomyelopathies causing a multitple sclerosis picture were easily elim-

inated. The last epidemic of encephalitis has left in its wake a comparatively large group of very interesting multiple sclerosis by-products. Between may be found in varying degrees of pathological sharpness and etiological significance other cases of multiple sclerosis. There still remains, and has remained all throughout this gradual analytic-synthetic process, a tendency to rally around the concept of an *essential or primary sclerosis,* a type of intellectual acrobatics which is also seen in the considerations attendant upon the many problems found in that enormous diagnostic scrap-basket, epilepsy. Here at least a thousand etiological and pathological conglomerates have been found, and yet a residue of essential epilepsy is clung to by many.

It is to such a concept that the author directs his attention at this time. It is within this group, the causes for some of which no tenable hypotheses have been formulated, that he would suggest further search, and this time into psychology. In certain of these types vascular lesions stand in the foreground. These seem to be in the nature not of inflammatory reactions, but some vessel wall disturbance of the nature of or related to analogous vascular phenomena, which has been studied as oedemas, etc. The "exudative diathesis" is the concept which has attempted to correlate these phenomena. In the selected *few or many* cases—no one yet is in a position to say how many or how few—Jelliffe considers the vascular regulating mechanisms in the neuraxis, in their relation to the functional work they are called upon to do. Thus a football kicker, or a runner, or a rower, or anyone performing a definite job, imposes upon the integrating activity of the nervous system a definite series of patterns: Certain cortical association bindings; certain pyramidal pathway regions; certain synaptic junction bridges, and certain anterior horn cells, and certain muscle end plate cells, all get together, function more intensely and put over the pattern in purposeful action, for the individual and for the race.

This is the type of all activities, all behavior. Now, in all this synthesis the vascular mechanisms, including the lymphatics and veins, are playing a very important rôle. The humoral side, the material, chemical side of the whole action pattern must be attended to; and specifically attended to. Any defect in any of the biochemical ingredients throws the orderly working of the required pattern out of line to a greater or lesser extent. This, for instance, may be seen in the defect in calcium in its relation to muscle jumpiness, as tetany, spasmophilia, tremor, etc., varying quantitatively and coördinatedly with the synaptic junction regulation brought about in part by the calcium content. Neurological regulation of metabolism is a very pertinent fact. The organism as a whole functions by means of and through the nervous system, and it is the vegetative nervous system, the phyletically primitive nervous system, which is serving chiefly in this synthesis of metabolites and through the vascular mechanism.

Now the author would attempt to link up emotional factors with the orderly working of this whole action patterns synthesis.

Here he leaves the high road of conventional psychology and seeks for emotional disturbances in the unconscious. Every one knows how conscious emotional factors, which usually are operative for a short time only, and, for the very reason they can become conscious, are capable of discharge at comparatively low states of tension, can produce far-reaching changes in the nervous regulators of metabolism. While fully recognizing the value of this mode of approach, Jelliffe proposes to search the unconscious in these patients to see if there are any important emotional factors, which, because of their inability to be released in ordinary conscious states of motor activity, are held under strong repressions, since strong repressions are invariably correlated with increased tensions. It is not conscious terror, with crying, horripilation, dilated pupils, tremor, etc., in which the patient can release nervous function, by sweating, or crying, or diarrhea or flight, that creates the mischief in the machine. It is the unconscious terror for which no release through projicient displacement can be found that creates the breakdown of structure. To one who has studied the unconscious it is obvious why the cravings cannot be satisfied, and equally plain why terror, not known as such, must be intense. These cravings strike at the very foundations of biological and sociological evolution. They would turn back the progress of the patiently won victories of creative evolution. They are anti-social, anti-creative: they would destroy society and the individual, hence they have to be held under. Hence they throw specific stresses upon action patterns which would seek their release. These stimuli are operative all the time, not periodically, as in Pavloff's animals, in Cannon's cats, in all of the physiological pecks at the problem, but 24 hours out of every 24, 7 days out of every week, 52 weeks out of every year, the let-up only occurs in the dream life of the individual, waking at times (creative activities) or sleeping.

Now there is an attempt made to illustrate how the specific vascular needs connected with the action pattern under unconscious stress, with high states of tension, cause the exudative phenomena in the blood vessels of the nervous pathways intimately related to the function under repression. Illustrated material is offered.

Jelliffe argues that the position thus evolved is quite a simple one. Just go to the unconscious and see what one can see. If there is nothing there, well and good. If on demand the grocer has no sugar, why, there is no sugar, that's all, but when it came to the study of the unconscious in about one half dozen cases of so-called multiple sclerosis, the situation was quite different. There were difficulties there which were of great importance from the psychopathological point of view as developed by recent studies of unconscious processes.

He says that as yet the appraisal of the emotional tension factors in relation to findings of the unconscious are formulating. Whereas external methods of measuring the force of emotional factors have been going on for a number of years, study of internal means of registration are only just beginning.

Here the Freudian conception of the Oedipus Complex is of paramount value. Here is a mechanism which shows the evolution of social integration. The race has grown upward by putting a ban upon its regressive tendencies. This is expressed through a formula which may be followed by means of an understanding of what is happening to the Oedipus Complex. At birth, and until two years of age, no individual analysis has yet been carried out, for obvious reasons. From two to six years of age is the usual period of adjustment wherein the phyletic struggle for sex taboo of the regressive object, the mother, the older woman, the sterile woman, is recapitulated in the life of the child. Repression at 5-6 has resulted in a progressive aspect towards the love object and towards creative activity. Repression with sublimation has begun. From this point onward one can trace the successive steps of the evolution of the Oedipus Complex, from its old impossible setting to its successively newer and better settings, making for real evolution in the individual and the race. The steps of this evolution are discernible in the unconscious. The percentage values of regression and of advance are there, dimly discernible.

When one casts in his line in this ocean of the unconscious, what stage of Oedipean fish did one find in the multiple sclerosis cases? All of the patients thus far examined showed marked psychosexual fixations at very early stages of this conflict. One patient, a very young multiple sclerotic, had hardly emerged from the uterus in his unconscious phantasies. His general life, if written by a novelist, would reveal him still in swaddling clothes, so attached was he to the parental complex. Another showed a close relation between the location of the symptoms and the patterns of his unconscious cravings which were under strong autonomic states of tension. The blood vessels broke down where the functional units necessary for nervous release were under the greatest strain. Thus an intense conflict of looking away from his cravings became symbolically patterned in a strong rotation of the eyeballs in a certain direction. This was always more or less consciously resisted. The pull of certain muscles under constant strain first determined a choroiditis, which extended to the retina. Brouwer's study of the phylogenic situation of the eye muscles, Sherrington's study of the proprioceptive innervation factors, and the well-known aversion looking away from guilt symbolically, are referred to and attempts made at their correlation to show how the vascularization of areas under stress may be gravely affected. Jelliffe goes into specific details of unconscious mechanisms and suggests in a purely tentative manner possibilities of correlation here.

He thus comes to a general conclusion that inasmuch as emotional factors are known to produce somatic alterations; that unconscious emotional factors are known to be under greater tension than conscious ones, and are operative more constantly, sometimes continuously during the waking life, to hold back anti-social cravings, such unconscious emotional factors are capable of producing graver and

more lasting somatic alterations. They can produce what we call acute or chronic physical disease. Just what type of disease is caused will depend upon a host of factors, but of these, any particular stress put upon any particular action patterns will determine the direction of development of the organic disease.

A study of the unconscious factors in organic disease therefore becomes of paramount importance. Such attempts have been made now by the author for the past ten years. Other students have come to quite similar results. He gives the literature. This particular tentative sketch of multiple sclerosis is but one of these studies.

He would advocate a study of the unconscious factors, in this disease, because he believes there will be found, in certain types of the disease, certain vascular alterations, which produce the plaques. These plaques interrupt pathways, which cause the visible signs, which at this age of our misinformation in medicine are but a grotesque physical caricature of that which we now label "multiple sclerosis." These vascular alterations occur at certain places where visceral-nerve-arc tensions are paramount. These nerve-arc tensions are dependent upon action patterns held under terrific repression. Since the contemplated actions are repugnant to the individual and destructive to him and to society, they must remain unconscious for a number of reasons well appreciated by students of modern psychopathology.

Jelliffe considers alternative methods taken by patients with similar repressed material. He relates efforts at release of such severe repressions to catatonia, to catatonic brain edema, where it fails, and to certain crippling psychoneuroses—notably compulsion neuroses, and suggests a number of correlated points showing how energy is switched in this or that channel—causing different symptom pictures, all fundamentally trying to handle the same kind of unconscious material.

THE RELATION OF MULTIPLE SCLEROSIS TO DISORDERS OF THE VISCERAL NERVOUS SYSTEM AND THE GLANDS OF INTERNAL SECRETION

By Walter M. Kraus and Irving H. Pardee

Quite contrary to what might be expected on casual consideration, the clinical manifestations of involvement by multiple sclerosis of the visceral nervous system and its end organs are very limited. The pathology of the condition in the spinal cord and brain stem would lead to the belief that both the primary visceral paths arising above the midbrain and extending into the spinal cord, as well as the secondary or preganglionic paths arising segmentally in the spinal cord, would, by involvement, yield very readily appreciable clinical manifestations. This is rarely the case. The reason for this lies, in all probability, in the fact that the peripheral portions of

the visceral nervous system present a certain automaticity when cut off from their central connections. In very acute stages of the disease, some visceral manifestations may be present, such as tachycardia, paralysis of the bowels and bladder disorders. No evidences of disturbances of the glands of internal secretion were found which could be attributed to the disease. This does not mean that disturbances were not found. However, they were not uniform and could not be shown to be causally related to the disease. Any consideration of the condition of the pupil demands that syphilis be excluded. In ten of twelve cases examination has not shown any change in the form, size or reaction to light or accommodation of the pupils. In two cases the pupils were small and reacted very slightly to light or in accommodation. Differences in the size of the pupils, due to differences in the extent of the atrophy, were not noted (such differences have been reported). In over half the cases examined the pulse rates as charted in the nurse's record showed a tachycardia. In the same number of cases the pulse rate, as examined by us, was found increased considerably above normal (up to 120 per minute). The elements of emotion in this examination must be considered.

At the present time it seems most probable that visceral manifestations occur mainly in the acute stages of the disease. There seem to be evidences of paralysis rather than of irritation. When the acute stage has subsided there seems to be a return to normal, possibly due to the automaticity previously mentioned. Pupillary changes may exist in the chronic stages of the disease. It is possible that visceral disturbances are present in a form so mild as to be clinically indeterminable by the ordinary methods of examination. We have not observed them, however.

EXOGENOUS CAUSES OF MULTIPLE SCLEROSIS

LEWELLYS F. BARKER, M.D.

Though intoxications and infections, physical and mental traumata, have been incriminated as responsible for the development of multiple sclerosis, the writer could find no evidence of this in a series of over thirty cases analyzed in his private practice and in the records of the Johns Hopkins Hospital. At most such agents could act only as predisposing or exacerbating causes. The author did not deny, however, the possibility of multiple sclerosis being due to some specific infection.

PATHOLOGIC STUDIES IN THE PATHOGENESIS OF MULTIPLE SCLEROSIS

GEORGE B. HASSIN, M.D.

The specific problem was: Has multiple sclerosis any pathological constant in its pathogenesis?

Patches which hold such a prominent place in the pathology of multiple sclerosis may occur in a number of other morbid conditions.

Thus, general paralysis of the insane, disseminated encephalomyelitis, traumatic lesions of the brain and spinal cord, so-called encephalopathies, all may show patches. Grossly as they do sometimes resemble multiple sclerosis plaques, microscopically they greatly differ, the patches in each of the foregoing conditions exhibiting certain characteristic individual features. The latter, in multiple sclerosis, consist in the growth of neuroglia tissue which, in a fully developed patch, is so constant, so marked, that the earliest students of this disease (Charcot, Froman) considered the glia formation its essential, primary feature. Strümpell and Müller have gone further, claiming that in multiple sclerosis we deal with an inborn tendency of the glia to proliferate, that is to say, with a developmental anomaly of the glia tissue.

Rindfleisch, Ribbert and many others, while not denying the abnormal growth of the glia, looked upon it as a phenomenon, secondary to vascular lesions. Borst put additional blame on the lymphatics of the central nervous system, and Leyden considered multiple sclerosis as a pure inflammatory process, as a subacute or chronic myelitis.

The inflammatory nature of this disease has been recognized by the majority of students, and only very few investigators (Adam-Kievitz, Huber, Redlich, Sanders) considered it as a pure parenchymatous lesion. The question of the histogenesis of multiple sclerosis is thus in a state of great confusion, and further investigations are imperative.

His studies, carried on on material from thirteen cases of multiple sclerosis (duration from two to twenty-five years), demonstrated that the initial stages of the patch, its infancy, as it were, should be looked for not in the patch itself but in the apparently normal adjacent areas, as well as in the transition zones where these exist. Such areas show a great many fibers with the myelin preserved but swollen, fenestrated, spindle shaped or varicose—an abundance of Elzholz bodies and a beginning formation of Marchi globules. These phenomena are associated with glia changes—proliferation of glia nuclei, formation of cytoplasmic glia cells and of phagocytic glia bodies described by Jakob as myeloclasts. More marked changes are in the transition zone. Here are many nerve fibers completely destroyed, Marchi globules are more abundant, while the glia is represented by an abundance of myelophalges and various types of gitter cells. The melophages are large vacuolated bodies containing within their vacuoles remnants of axones and myelin which they transform in lipoid substances. The latter are enclosed within gitter cells (α, β, γ). The latter structures denote an advanced stage of nerve destruction, in contrast to Marchi globules, myeloclasts and myelophages which are typical for early stages (55 hours to several days after a nerve lesion).

The patch itself represents a scar consisting mainly of thin glia fibers, of a number of preserved axones, few myelinated nerve fibers, glia nuclei rich in chromation, and in some instances of gitter cells.

The scar presents the final stage of nerve degeneration, which begins as tumefaction and fenestration of the myelin and is followed by the stage of myelophage and gitter cells formation. As the same stages of scar formation can be followed up in studies of experimental degeneration of central nerve fibers (studied by Jakob) or of peripheral nerves (studied by Doinikow), the outlined pathologic changes in multiple sclerosis must be looked upon as purely degenerative. Beginning as a periaxial neuritis, they are followed by the destruction of the axone of the central nerve fibers, ultimately resulting in Wallerian, or secondary degeneration. The morbid process also resembles, in its essential characteristics, subacute combined degeneration, amyotrophic lateral sclerosis, ascending and descending degenerations, etc.

In contrast to pronounced and widespread parenchymatous changes, inflammatory phenomena are absent. The vessels do show changes, in the form of thickened hyperplastic walls and distended Virchow-Robin spaces packed with gitter cells (J variety). In extremely rare instances, and only in the brain tissue, plasma cells and lymphocytes may be encountered, but in very small amounts.

The same is true of the pia arachnoid, which is thickened, the meshes distended and infiltrated with proliferated mesothelial cells, fibroblasts, lymphocytes and gitter cells.

Both the vascular and the pia-arachnoid changes are present in normal regions as well as in or around areaed harboring patches. Neither of these structures plays any rôle in the genesis of a multiple sclerosis patch. Their changes, like those of the glia, are secondary to a primary, parenchymatous process.

AN INVESTIGATION OF THE AXIS CYLINDER IN MULTIPLE SCLEROSES.

JOSHUA H. LEINER, M.D.

Staining old and recent plaques, particularly of the spinal cord, in both longitudinal and cross sections with Jakobs analine blue and gold orange method according to Mallory, allows of a differentiation of the medullary sheath, the axis cylinder and the glia inone and the same section.

Studying the axis cylinders in multiple sclerosis there is found thickenings, globular distensions, vacuolization, disintergration and many thin fibrillae in the older sclerotic areas.

The purpose of this investigation was the question of the relationship of the medullary degeneration to the degeneration of the axis cylinder, and vice versa.

Gomboult and also Stransky have described a type of periaxial degeneration in the peripheral nerves—wherein the myalin is first involved, and the axis cylinder secondarily. Marburg has shown this type of primary medullary degeneration to occur in the central nervous system, in multiple scleroses.

This type of reaction was also produced by Shimazono in experimental lead poisoning. Kimura believes however that the axis cylinder is primarily affected in peripheral nerve affections.

Siemerling and Raecke, Fraenkel and Jakob maintain that the axis cylinder is primarily affected in multiple clerosis, the latter adopting the hypothesis that it actually begins as a vascular disease. Shimazono and also Wholwill point out a close resemblance histopathologically of multiple sclerosis and pernicious anemia. There are apparently two types of reaction, one alleged to begin in the axis cylinder, and the other in the medullary substance. In the majority of cases, however, one thing is certain, that in multiple sclerosis the lesion of the medullary sheath is more serious than the axis cylinder.

The button, club or globe shaped inflations at the ends of the axis cylinders have been also studied, but we are not prepared to say, with either Doinikow, Marinesco and Minea, that they are significant of regeneration of the axis cylinder. It has been demonstrated by Miyake, in the Neurologische Institute of Vienna, that one day following complete spinal cord section these bodies were seen, *i.e.*, at a time when regeneration could hardly be thought of.

The markschattenherde (medullary shadows) of Schlesinger cannot be interpreted as an attempt at medullary regeneration.

Spiegel of Vienna attempts to prove and explain the remissions of multiple sclerosis on the bases of edema. His experimental researches with his polarization microscope is highly convincing.

To summarize: (1) That the axis cylinder suffers a lesion which may lead to its destruction. (2) That in a great part of the time the axis cylinders survive the lesion, and the primary edema is followed by a subsidance of the same. (3) That our sections have proved further that the disintegration of the medullary sheath is in every respect more complete than that of the axis cylinder, and that it may be found completely destroyed, even when there are comparatively well-preserved axis cylinders present. (4) That in isolated instances the medullary sheath is preserved, at least in part, in the shape of a ring round the axis cylinder. (5) That for an explanation of the lesion affecting the axis cylinder, we adduce Spiegel's conception—that every decomposition or disintegration of the medullary sheath is accompanied by a simultaneous edema of the axis cylinder, evoked by chemicophysical processes. (6) That these edemas are reversible, not only pertaining to anatomical configuration but also to function. (7) And, lastly, that this conception may explain the clinical fact that, despite the presence histologically of a serious lesion, the function was found preserved, and probably a further explanation is furnished by the phenomena of the glia, forming a dense protective cover round the axis cylinder in the earlier stages of the disease, taking the place in part of the disintegrated medullary sheath.

(The above work was done in The Neurologische Institut, University of Vienna, under Prof. Otto Marburg, 1921.)

MULTIPLE SCLEROSIS AND THE METHODS OF ECOLOGY

DR. CHAS. R. DANA

Ecology is the science of the relation of living organisms to their environment. It was originally used by botanists or plant ecologists, but it has been adopted by zoölogists and by students of entomology, hence it can be applied to the study of pathogenic bacteria. Ecologists study groups or "formations" rather than individuals; the forest, not the tree; the tribe, not the man.

Human beings suffering from multiple sclerosis form a group or ecologically a "formation." This group is studied as to its internal factors and external factors, and both the pre-natal and post-natal history are considered.

It covers all that is usually classed as predisposing causes, bearing in mind the general idea of the affected human race forming a certain widespread disease "formation."

It involves the study of the geography, race, climate, factors of soil and water, habits of life, occupation, existence in other animals, relation to other diseases, immune areas and races.

The linking together of causes, as illustrated in the polar Esquimaux, whose existence is due to excess of CO_2 in the Arctic Ocean, is emphasized.

The use of the ecological "quadrat" system is suggested, by which certain areas are intensively studied for a number of successive years.

The study of the extra-human factors is followed by a study of the soma, *i.e.*, of the body of persons affected. This brings in another group of predisposing causes: family characters, age, sex, infections, endocrine and metabolic conditions, previous diseases, immunizing factors, special morphological types. Multiple sclerosis seems especially to affect the linear or dolichocephalic type.

The third line of study involves the immediate habitat of the organism, the nervous system, why this tissue is selected and what brings the organism there. Classification of bacteria by tissue preference if possible.

The author reports that he has a field worker, Dr. Mary M. Sturgis, who is collecting by intensive field work data covering the environmental and somatic conditions of ten selected cases. This work will be continued for one or two years, but already some results have been obtained as to the ecology and etiology of multiple sclerosis. The problem is a long and a difficult one, for even if the bacterial cause is found, it will be only by such full studies that our knowledge of multiple sclerosis will be complete. Ecological methods suggest wider and more intensive field studies than have yet been made.

INCIDENCE OF MULTIPLE SCLEROSIS IN UNITED STATES TROOPS

PEARCE BAILEY, M.D.

During the recent mobilization the neuropsychiatric officers examined approximately 3,500,000 men, draftees and volunteers. The examinations were made at the camps, and in the case of draftees, after acceptance by draft boards.

A total of 69,394 cases of nervous and mental disease and defects were identified. They were divided into nine clinical groups. The subhead under which multiple sclerosis was classified was entitled "Organic Diseases and Injuries." It included injuries, the general organic diseases of the nervous system, syphilis of the central nervous system (exclusive of paresis), a few minor conditions, such as tics, myasthenias, myotonias and other conditions. This group embraced 6916 cases, about one tenth of the total number.

Our method of approach to a determination of the frequency of multiple sclerosis is to determine its frequency, not in relation to the number of men examined, but in relation to other nervous conditions found in the particular group to which it belongs. For example, among 6916 so-called cases there were 511 cases of multiple sclerosis. We may say, therefore, that multiple sclerosis has a distribution average among organic conditions of 7.4 per cent.

Variations from this average occurred in certain states and in certain races. The variations in states was in approximate agreement with the results given in "Defects Found in Drafted Men." The variations as to races are given in the table.

Of the fractions given in the table, the numerator indicates the number of cases of multiple sclerosis found in the race, and the denominator indicates the total number of cases of general organic conditions in that race. The resulting percentage is the percentage of cases of multiple sclerosis as compared to organic conditions in that race. It will be observed that the percentage of cases of the disease in the Scandinavians, the French, the Slavs, the Scotch, the Germans, the English and the Irish, all exceed the general distribution rate of multiple sclerosis. Also, there was an excess of cases in the foreign-born as compared with the native-born.

The average of foreign-born in the whole group of organic conditions was 9.2 per cent, while in multiple sclerosis it was higher, namely, 12.7 per cent. Thirty per cent of the patients with multiple sclerosis gave a family history of nervous diseases (as compared with syphilis of the central nervous system, for example, in which only 7 per cent of the patients had a family history of nervous diseases); 10 per cent gave a family history of nervous disease.

Percentage Distribution of Multiple Sclerosis Among Injuries and Diseases of the Nervous System as Determined in Certain Classified Races

Total number of cases of nervous diseases and injuries	6919
Total number of cases of multiple sclerosis	511
Average distribution rate of multiple sclerosis	7.4%

	Cases of Multiple Sclerosis	Cases of General Organic Diseases	Percentage
African	28	800	3.5
Dutch	4	38	1.0
English	74	913	8.1
French	11	102	10.7
German	35	418	8.3
Irish	41	516	7.9
Italian	10	191	5.2
Scotch	8	96	8.2
Scandinavian	16	127	12.5
Slav	18	181	9.0

STATISTICS OF MULTIPLE SCLEROSIS, INCLUDING A STUDY OF THE INFANTILE, CONGENITAL, FAMILIAL AND HEREDITARY FORMS, AND THE MENTAL AND PSYCHIC SYMPTOMS

I. S. Wechsler, M.D.

This study was based on the records of 1970 cases, 1773 of which were culled from the literature and 197 records personally studied. There were 1452 cases from European countries and 518 from America, or rather from New York City. Except for the 197 personally studied records nearly all dated back many years.

While the incidence in early American cases was very low, 0.36 per cent of all neurological cases, or about one fourth as frequent as the European records, the recent cases showed an incidence of 1.1 per cent, or almost equaling the European figures. It is quite probable that the recent increase in incidence is due to a more elastic conception of the disease entity.

The ages varied from very young ages (it has been described in 100 cases in children, see below) to sixty-five years. About 70 to 75 per cent of cases occurred between the ages of twenty and forty. The duration of the disease was from a few weeks to thirty-five years. There were 58 per cent males to 42 per cent females out of a total of 1505 cases in which the sex of the patient was mentioned. Practically every occupation was represented in the group, although some authors maintain that the disease is most common in the laboring and agricultural classes. The nativity of the American cases personally studied showed an incidence of 81.5 per cent foreign-born to 18.5 per cent native. Although all the cases came from New York, where the foreign population is great, this fact alone cannot explain the high foreign incidence, but may throw some light on the comparatively greater prevalence of the disease among Europeans.

Of the 100 cases of so-called multiple sclerosis in children, by far the greatest number represented atypical cases of congenital, disseminated lues, various traumatic birth palsies, spastic diplegias,

Little's or Foerster's types, family spastic paralysis, Friedreich's disease, tumors of the brain, hysteria, encephalomyelitis and cerebral sclerosis. A few cases have been proved both clinically and pathologically to have been multiple sclerosis in children.

Although a number of cases have been reported as occurring in more than one member of a family, or in parent and offspring, if rigid criteria are employed it may be definitely stated that no proof has been adduced to show that the disease is either congenital, familial or hereditary. In only one instance, that of Eichhorst, could the possibility of a congenital factor be entertained.

European statistics refer much more frequently to mental or psychotic symptoms in multiple sclerosis. Psychic and nervous manifestations are very common in the disease and emotional changes almost equally so, but true mental symptoms have been comparatively rare in the American records. Hysteria and paresis frequently occasioned diagnostic difficulties; this was particularly true of the former. The mental symptoms most nearly resembled those found in organic brain diseases, and were to be found in cases of multiple sclerosis with cerebral involvement.

MULTIPLE SCLEROSIS FROM THE STANDPOINT OF GEOGRAPHIC DISTRIBUTION AND RACE

C. B. Davenport

Distribution: If the statistics of the cases of multiple sclerosis found in the draft examinations be plotted on a map of the United States, it appears that the maximum rate for this diagnosis was in the states of Michigan, Minnesota and Wisconsin—states bordering on the Great Lakes. If the distribution of multiple sclerosis be compared with that of other diseases, it is found that the diseases giving a most nearly similar distribution are goiter, exophthalmic goiter, chorea, varicose veins, varicocele and allied diseases, and various heart diseases and defects. The cardiovascular diseases are associated with the tall stature of the men living about the Great Lakes—largely Scandinavians. Chorea has a much wider distribution than multiple sclerosis, outside the Great Lakes; both it and multiple sclerosis have high rates in the states of Washington, Mississippi and Maine. The resemblance of the distribution of multiple sclerosis to that of goiter is even more striking. It seems probable that there is some race inhabiting the Great Lakes region and the state of Washington that is especially subject to multiple sclerosis, as well as chorea, goiter and cardiovascular defects. One thinks of the big Scandinavians that live in this country, and there is certain evidence that Scandinavians in New York City have a larger number of cases of multiple sclerosis in the hospitals than their population in the city would warrant.

For the United States, as a whole, the defect rate found in the draft was 10 per 100,000 of the population examined. The urban rate was 12 per 100,000 and the rural rate 8 per 100,000. For four

large cities combined the rate was 14. For several cities separately it is: Philadelphia, 23; Boston, 15; New York, 13; and Chicago, 11. Southern agricultural communities prevailingly white give a rate of 7 per 100,000; southern agricultural communities prevailingly colored, 6; northern agricultural communities prevailingly white, 8; prevailingly foreign, 10; mountain sections, 2; Scandinavian sections, 16; German and Austrian sections, 10; Finn sections, 29; French Canadian sections, 8. The high ratios found in Scandinavian and Finn sections are probably significant. However, both "Finn" sections are in the Great Lakes region, in the region of high sclerosis rate.

The data concerning racial distribution are not altogether satisfactory because of the lack of homogeneity of the "population" upon which the rate is calculated. This population is generally taken as that of "nervous" cases, but in the different statistics the "nervous" cases are variously selected. At the meeting of the New York Neurological Society in 1902 the incidence of multiple sclerosis among "nervous" cases was reported as from 2 to 7 in different instance, except that Dr. Onuf found 14 per 1000 in a group of 500 to 600 cases and Fraenkel found among Jews at Montefiori Home 18 per 1000. In 1903, Taylor and Myers got a rate of 1 per 1000 among "nervous" cases in Boston. They stressed difficulties of diagnosis and stated that if certain ataxic paraplegias, diffuse degenerations and spastic degenerations were admitted the rate would be increased to 4. Van Wart in 1905 found a rate of 44 per 1000 among 5000 "nervous" cases in New Orleans.

In European countries the rate is usually higher than in the United States, and the Bramwells (1903–1915) found a rate, first, of 20 and later of 22 in Scotland and in the north of England. Williamson is said to have found a rate in Manchester of 27 per 1000, and the National Hospital for Paralyzed and Epileptics in London was 60 per 100 of "nervous" cases, but these were a selected lot of nervous cases.

The negro race is not immune from the disease, though probably less subject to it than the white race. Bauer (1921) states that the disease is infrequent in Japan.

Heredity: If there is any racial tendency to multiple sclerosis in the strict sense of the word, then by the same criterion there is an hereditary factor in it. Usually inquiry of the patient elicits no other cases of the disease, or anything like it, in other members of the family. In other cases positive evidence of recurrence in the family is obtained. It has been suggested that in multiple sclerosis there are two diseases, one which is associated with an inflammation and degeneration of the nerve sheath and the other due to a primary hyperplasia of the glia. Just as multiple neurofibromatosis is hereditary, so it is possible that the latter type of multiple sclerosis is hereditary and not the former.

A number of family histories have been worked out that show the recurrence of the disease. The most extensive case is that first

described by Pelizaeus (1885) and continued later by Merzbacher in 1909. There are a great many affected persons in this pedigree, but doubt has been cast upon the diagnosis. Another considerable pedigree is contributed by Batten and Wilkinson (1914), and this, like Merzbacher's case, shows the ordinary sex-linked type of heredity. Numerous hereditary data for the disease have been brought together by Klausner (1901) and Röper (1913). Most of these histories and those obtained later have been those of recurrence of the disease in two generations, usually mother and child. It is much more common, however, to find the disease in two or more persons of the same fraternity without any history of the disease in the next preceding fraternity. In conclusion, the suggestion is made that whatever may be proved eventually to be the endogenic cause of multiple sclerosis, the factor of heredity cannot be neglected. Just as inoculated tumors or pathogenic organisms succeed in growing, or fail to grow, depending upon the racial constitution of the organism, so there are probably internal conditions that inhibit and others that facilitate the development in the body of this disease or of the endogenous factors upon which it depends. In consequence, the manifestations or symptoms of the disease are different in different persons; and they are sometimes very similar in closely related individuals because the hereditary factors of the constitution in which they operate are similar.

CURRENT LITERATURE

III. SYMBOLIC NEUROLOGY.

1. GENERAL PSYCHOPATHOLOGY — NEUROSES — PSYCHONEUROSES.

Hammett, Frederick S. OBSERVATIONS ON THE RELATION BETWEEN EMOTIONAL AND METABOLIC STABILITY. [Am. J. Physiol., Balt., 1920, 53, 307-311.]

This paper is a report of the differences in variability of the nitrogenous constituents of human blood observed in persons of high and low emotional stability as evidenced by their reactions to changes of the environment. Seventeen individuals in all were studied some of them patients at a hospital for the insane and some of them nurses at the same institution. The general trend of the results seemed to indicate that those individuals showing a high emotional instability also demonstrated a high metabolic variability as measured by the sum of the coefficients of variability of the blood constituents determined; while those persons in whom there was a lesser variation of the intermediary metabolism usually were individuals in whom the emotional reactions were of a low order. The logical conclusion to be drawn from this, is that larger variations in intermediary metabolism are prone to accompany conditions of ready emotional response of a marked nature to disturbing stimuli, while on the other hand the variations of the metabolism in persons who are less susceptible, is liable to be relatively low. This influence of a state of chronic emotional instability on metabolism serves in part to give an understanding of the emaciation types frequently encountered in psychiatric practice. [Author's abstract.]

Prideaux, E. SUGGESTION AND SUGGESTIBILITY. [Br. Jour. of Psychology, Vol. X, parts 2 and 3, 1920; Brain, Vol. XLII, part 4, 1919.]

This study is an attempt to outline more clearly the general nature of the whole process of suggestion and supports Bleuler's statement, "Suggestion is an affective process." The definition adopted as including all varieties of suggestion is as follows: "Suggestion is a mental process resulting in the acceptance with conviction of a proposition, apart from the intellectual outcome of pure judgment based on logical premises." It is held that suggestibility is the chief factor in the process, which is a subjective one, and that there are at least four distinct kinds of suggestibility:

(a) *Individual,* that which varies in different persons irrespective of the nature of the suggestion or of the suggestor, (b) *Conditional,* that which varies in the same person at different times and under different conditions, (c) *Specific,* that which refers to a particular system of ideas only, (d) *Personal,* that which depends on the relationship between two persons.

The variation in *individual suggestibility* is shown to be due to the varying degree in which the instinctive tendencies are developed and the manner in which the sentiments have become organized to form ideals and act as "contrary" forces. The term "contrary" is used in the sense that forces are brought into action by stimulation of mental processes on a higher level and that these act in opposition to the instinctive processes on the perceptual level. The hypothesis is put forward that the further organization of these contrary forces in association with the self-regarding sentiment, influenced perhaps by the herd instinct, constitutes the "social ideal self." This term is used as a contrast to the "individual self," and it is held that suggestibility is exaggerated when there is an increased development of the instinctive tendencies (individual self) together with lack of organization of the "social ideal self."

Conditional suggestibility is said to be favoured by conditions in which the social ideal self is weakened—fatigue, alcohol, drugs, etc. *Specific suggestibility* is shown to depend on the variation in development of the specific instinctive tendencies, the formation of sentiments and interests, and the presence of complexes. *Personal suggestibility* is shown to depend on the instinctive tendencies operating between the two persons.

The results of attempts at suggestion in everyday life are classified into three groups: (a) *Positive response* when the suggestion is accepted; (b) *Negative response* when the suggestion is opposed; (c) *Neutral response* when the suggestion is refused. (a) *Positive response.* The author shows that an idea is accepted, not as originally held because there is inhibition of other ideas opposing its acceptance and because the idea realizes itself by ideo-motor action, but because it harmonizes with the state of suggestibility present, and because the affective forces involved produce conviction and give it the necessary re-inforcing power to realize itself in opposition to all contrary forces. It is held that suggestion has no capacity for inhibiting ideas, but, if we speak in terms of inhibition, is rather the consequence of the inhibition of inhibiting forces normally involved in volition. (b) *Negative response* is shown to be due to a state of negativism, which, like suggestibility, can be divided into four classes. It is considered as a form of overdetermination brought about by the presence of antagonistic complexes, which more than counterbalance the forces of a weak social ideal self. It becomes pathological in dementia praecox. (c) *Neutral response* is shown to be due to (1) strength of the social ideal self, as in

those who hold strong principles and ideals; (2) the absence of preformed interests or complexes to which the idea can attach itself, as in certain imbeciles; (3) the incompatibility of the idea with such interests as exist; (4) conflict of motives with the production of a state of doubt, a state which becomes pathological in anxiety hysteria; (5) various states of dementia. In accordance with these views the author finds it impossible to accept McDougall's classification of suggestion as an innate tendency, and holds that the process can only be explained by the action of the different instinctive tendencies, sentiments, complexes and interests involved.

It is shown that the object to be attained in treatment by suggestion, is to produce a condition of mind in the patient which will set going the right affective forces for the induction of those states of suggestibility, which will harmonize with and reinforce the ideas to be suggested and so get them accepted with conviction. This may be done by an appeal to the sentiments, by the effect of some emotional reaction such as surprise, by the counterbalancing of one emotion by another, or by the use of indirect suggestion through insinuation, with the help of drugs or deliberate deception. Suggestion is not claimed to be an ideal method of treatment and is not advocated as such, but is considered as a useful method in practice of removing symptoms in certain cases. [Author's abstract.]

Oberndorf, C. P. Some Phases of Auto-Erotism. [N. Y. Med. Journal, November 8, 1919.]

Oberndorf traces the Freudian conception of the development of sex from the pleasurable sensations which primarily accompany bodily functions such as suckling, swaying and the simpler tactile movements. He emphasizes that it is only if one agrees to extend the definition of sex to include these movements which are demonstrably precursory to subsequent undeniable sex activities, that one can accept the definition that all pleasure founds in the last analysis in sex pleasure. He points out that the part of the body from which the child derives the greatest pleasure in body movements may subsequently become a zone for erotic satisfaction.

This satisfaction derived from one's own body is in its most primary stages purely auto-erotic, and there is scant distinction between the sexes during the auto-erotic period. From the erotic impulse which arises spontaneously and from within and finds its actual satisfaction in the individual's own body, the next developmental step is that in which the individual directs his impulses toward his own person or toward an image which he has elaborated to represent himself (Narcissism). In the narcissistic stage the images are apt to be of a fanciful object something like himself, *i.e.*, a homosexual image. From this transient and variable narcissistic period the normal individual progresses to heterosexual love object.

The author then proceeds to the discussion of masturbation as a phase of auto-erotism and narcissism. While fully cognizant of the fact that the material which is studied in the consultation room of a neurologist cannot be regarded as normal, he states that nearly every patient whom he has treated analytically is conscious of having passed through longer or shorter stages of narcissistic sex life during which he has masturbated or adopted some not greatly disguised substitutes for masturbation. In the study of many cases in both sexes he has not encountered alarming physical results from the simpler forms of masturbation when practiced moderately. If forced to fix a limit he considers masturbation after the age of 20 as beyond the range of normal.

Dr. Oberndorf lays great stress on the psychic accompaniments of masturbation, which tend to remove the person indulging in them further and further from the realities and actual demands of love making. Later the fancies require a tangibility, a permanence and a hold on the life of the individual, so that they become a nucleus for his sexual life and a standard comparison for all subsequent sex activities. In addition to the inability of the masturbator to mask the unreality of his fancied achievements, there is the sense of guilt and dishonesty and the feeling that retribution in some form must eventually be paid.

The advice so lightly given at times by physicians that intercourse outside of wedlock will solve the dilemma of a patient deeply involved in auto-erotism, often adds to his difficulties. In marriage sexual shortcomings necessarily involve the happiness of another individual. In extra conjugal sex relationship, failures in coitus emphasize the maladjustment and cause great alarm to the patient. Patients of this type should have their inhibitions to heterosexuality removed before attempting intercourse. Psychoanalytic procedures are the only method to successfully remove such inhibitions. [Author's abstract.]

Des Bancels, J. Larguier. THE THRILL. [Journal de Psychologie, 1920, Vol. 17, p. 168.]

That certain sonorous vibrations affect deep or superficial sensibility is generally admitted, but the thrill differs entirely from this sensation. In the first place, the thrill is not produced by music alone. Hermite, extolling the beauty of pure mathematics, speaks of theorems which thrill him. Passages of Corneille thrilled Madame de Sevigne. Descartes places admiration among the primitive passions and, indeed, at the very head of the list. In the opinion of this philosopher, admiration is nearly synonymous with surprise, astonishment, and curiosity, but in the language of to-day it implies something more. We may be curious and surprised without experiencing the slightest admiration. We admire only that which is beyond us—which causes us to feel our own insignificance. Far from representing a simple emotion, admiration, as we understand it, is the resultant of a concourse of various tendencies, pre-

supposing, at one and the same time, curiosity, fear, and humility. All psychologists agree in recognizing in curiosity and fear original instincts, and humility should also be placed in the group of primordial tendencies, following Ribot and MacDougall, who class it among the social instincts. It was also placed here by Vilfredo Pareto, who studied the question only from the sociological point of view. This emotion is manifested in the infant at an early age, and is found in certain animals, notably the dog. Admiration, veneration, respect, is directed toward persons, for while inanimate things are admired, the sentiment in these cases seems to be always derivative; if, for example, a work of ingenuity or art thrills us.

Spitzer, Hugo. Psychology and Study of the Brain. [Archiv f. Psychiat., Vol. LIX, p. 401.]

The author deplores the tendency of modern philosophy to dispense with the assistance of physiology and neurology. The difference in the two viewpoints of philosophy and psychology is expressed by Feuerbach: "I am a psychological object for myself; I am a physiological object for others." Because certain invariable laws of consciousness are discoverable without abandoning the path of introspection or taking into consideration the physiological correlate many psychologists disregard the physical laws altogether, and to these the expression "physiological psychology" is a stumbling block. When the question is raised, however, what lends the sensations their qualities, their intensity, their duration, we are inevitably forced to have recourse to external perceptions for explanation, and this admission, psychologists fear, will commit them to materialistic monism. But apart from a very few extremists no scientist to-day regards sensations as depending directly on the reception of the stimulus, or thinks that sensations take place in the sense apparatus. The molecular movements are conducted by nerve paths to the central nervous system, and here it is that the sensation is produced. Thus in the connection of sense organ, nerve, and brain the same sort of influence of one thing on another of different nature is assumed, as the psychologists suppose, to take place at the end station. The only difference between the two views is that at the end station the psychologists see a physical force acting on a physical force; psychologists a physical force acting upon an entirely heterogeneous immaterial substance. Only to the detriment of psychology can the immense importance of physiology be disregarded. Even the spheres of the separate senses cannot be distinguished by introspection, and their confusion can only be avoided by following the knowledge gained from physiology and brain anatomy. The author describes separately the successive advances in the fields of brain anatomy, physiology and histology, setting forth the difficulties which were encountered, the significance of each discovery for psychology, and the problems which still exist for solution. Among the ques-

tions discussed is the importance to psychology of the discovery of the separate senses of temperature and the kinesthetic sense, the significance of psychophysical integration and facts ascertained as to the reflexes and the value even of teratology which throws light on the causes of the ontological determination of forms. [J.]

Forel, A. Telepathy and Allied Phenomena. [Journ. f. Psychol. u. Neurol., Vol. XXIV, p. 77.]

The concept of energy is and must ever remain metaphysical, states the author. Even though man should succeed a thousand years hence in artificially producing a living cell with all its inherited energies, he would not come a single step nearer to an understanding of the riddle of the universe—the absolute essence of things, the infinity of space and material, energy. However, as soon as phenomena are presented to us about which it is possible to obtain facts inductively, it is permissible to proceed experimentally with them. For this reason the author considers telepathy an object of experimental investigation. In reference to facts recently offered by v. Wasielewski, he suggests the hypothesis of a radiation of energy in the form of electrons from bodies. He thinks that we may assume without the risk of being considered mad that certain sensitive brains might perceive radiating electrons of objects without the intermediation of the senses. An indispensable condition of a phenomenon of this sort would be that the radiating complexes of electrons should encounter similar complexes in the "soul" or brain of the individual, *i.e.*, that there should be either in the superconsciousness or subconsciousness similar inscription complexes (engrammkomplexe), synchronously and homophonously attuned to the electron complexes. Without some such conditions any interpretation of clairvoyance, or foretelling or telepathy in a scientific sense would be unthinkable, because the phenomena always belong to the sense world. V. Wasielewski is opposed to this interpretation, wrongly, however, in the opinion of the author. In "divining" he thinks the emotion of anxiety is involved, and that the individual is more or less intensively interested in the event, subconsciously or superconsciously. [J.]

Gerson, Adolf. Pain and Fear. [Journ. f. Psychol. u. Neurol., Vol. XXIII, p. 55.]

For introspective psychology pain and fear have nothing in common, and physiology, judging from the different effects these two emotions have on breathing, circulation and other processes of the organism, would see differences in them. From a biological point of view, however, the author states they stand in a close relationship, both being defense reactions of the organism and phenomena of adaptation which make their appearance at the same evolutional stage. The following circumstances are evidence that fear first makes its appearance in the worms: in man there are on the cutaneous surface special points where pain alone is

felt and no other sensation, namely, points where there are free nerve terminations. It may therefore be assumed that these free nerve endings are specially designed for receiving pain stimuli. Descending the scale in the animal kingdom, similar free nerve terminations are found, and when the invertebrata are reached only these endings are found with no apparatus for receiving sensations of other sorts. It is probable that the feeling of pain in man and other vertebrata is localized in a definite part of the central organ, though just where is not known. By extirpations in vertebrates and arthropoda it is found that the fear mechanism (which causes an animal to feign death, or roll into a ball, etc.) is localized in the medulla oblongata, the cerebellum, or head ganglia, and it is probable that the feeling of pain is also localized here, and that both pain and fear make their appearance in the worms. Some species in the animal series may not possess the feeling of pain because a regression has taken place. The scales and shells which serve as armors for the arthropoda and lower vertebrata are elaborations of the fear mechanism, the purpose of which is to protect from pain. The author explains how, without disadvantage, these armors may be dispensed with, the fear mechanism making use of another device to temporarily suppress pain. The activities of the central nervous system are dependent on the inflow of blood, and there is a direct connection of this system with the heart over the vague path, this latter being in turn connected with the pain mechanism. When there is stimulation of pain sensibility the blood streams from the periphery and brain causing cessation for a time of the painful feeling. This withdrawal of the blood from the brain not only annihilates pain, but also causes a cessation of the flow of ideas in consciousness, which may be an added protection in danger because ideas might interfere with the movements of defense. The loss of consciousness in danger is, therefore, a part of the fear mechanism which man has inherited in the evolutional processes, and is allied to the mechanism which makes animals hide or feign death when they fear the approach of danger. [J.]

Stern, Erich. Experimental Psychological Examinations of Individuals Suffering from Brain Wounds with Reference to the Psychology of Thought. [Journ. f. Psychol. u. Neurol., No. 23, p. 77.]

Careful examination of an extensive material were undertaken for the purpose of determining what effects brain wounds have on simple mental processes, such as the recognition of objects, naming them, or designating objects described. A considerable retardation of the psychic processes was discovered, as well as an enormously increased fatigability and divertibility, so that the patients were constantly in need of placing the problem anew before their minds, giving the impression of a perseveration. A further characteristic was the lack of self-confidence,

These patients showed a strong emotional element accompanying their mental efforts, pain and tension when striving to solve the problem, and relief and pleasure upon arriving at a conclusion. This emotional element demonstrated the justification for the view that when a judgment is formed which furnishes us with knowledge, there is a "value" attached psychologically to the experience. These mental tasks, which are performed by normal individuals reflexly, these patients could only accomplish by a series of laborious steps, showing that there was a reversion to a more primitive level of mental activity. [J.]

Ziehen, Th. Some Additions to the Methods of Testing Intelligence. [Archiv f. Psychiat., Vol. LIX, p. 493.]

The author offers a few additions to his "Principles and Methods for Testing Intelligence" (1918). He emphasizes the fact that the so-called association theories of psychology often make the mistake of seeking to explain the combination of thoughts according to content by the laws of association. The association of ideas in conformity with the laws of association depends on the course run by a certain brain process, and not on apperception and the like, while the grouping of ideas according to content depends on the function of certain cortical elements, which are designated by the author the function of differentiation. In the field of thought they are similar to the specific sense energies in the field of sensation. The author states that there are only three such irreducible functions of differentiation, namely, the synthetic function, the analytic function (and here the author places the faculty of choice, the isolating and emphasizing activity of attention), and the function of comparison. The most important task of psychiatric diagnosis, in the author's opinion, is to find practical methods of testing these functions, as far as possible, separately, or in adapting existing methods to this purpose. [J.]

Cellerier, Lucien. Organic Reactions Accompanying Psychic States. Archives de Psychologie, 1919, Vol. XVII, No. 68, p. 257.]

The purpose of the author is to determine what relation exists between psychic states and the organic reactions accompanying them. He adopted a very simple method of experimentation (measurement of modifications of the circulation), cutting loose from all current theories, but taking into account the long series of previously published experiments in the same direction. One fact was established with certainty: activity, whether mental or corporal, is always accompanied by the same reaction. The curve of activity, though it may appear complex, is always a simple act of adaptation. Mental activity, concentration of attention, and bodily effort are all forms of adaptation of the organism to a new situation. In that adaptation the dominant feature is the excitement of the circulatory system for the purpose of furnishing to the organs the elements of nutrition requisite for the new expenditure

of energy in adaptation. In regard to the affective states, the author found an indication of a specific reaction characteristic of pleasure and of displeasure, such as the German psychologists describe. It is surprising that such a large number of authors should have admitted the existence of these specific reactions when their own experiments contradict their assumptions. The author perceives three phases in the curve of activity: (1) a transient acceleration of the pulse; (2) a transient slowing of the pulse, and (3) a prolonged acceleration of the pulse. Those writers who claim that there is a specific reaction for pleasure and another for pain direct their attention only to a single phase of the curve and, considering it as independent, contrast it with the other phases of the same curve. The value of their work consists more in the imposing quantity of experiments which they have given to the world than in the worth of their deductions. Lehmann and Berger erect theories on these assumed specific reactions, seeking to establish a correlation between them and the activities of the cerebral cellules, but as their point of departure is false, they arrive at an unsupported conclusion. The theories of Weber have no better foundation. Even if there were a constant reaction of states of pain it would still not be permissible, as Weber suggests, to attribute to this specific reaction a rôle of regulator for sparing the individual a too lively sensation. In all affective states, of displeasure, of pleasure, and of pain, one unvarying corporal sign is presented, in the opinion of the author—that of activity, indicative of attention, of muscular tension, and preparation for adaptation to a new situation. [J.]

Hoag, David Edward. THE PSYCHOLOGY OF THE CONSCIENTIOUS OBJECTOR. [New York Medical Journal. Jan. 31. 1920.]

The aim of this paper is to make clearly evident that the conscientious objector, although a manifestation of war, is a product of peace, and that the causes of his objections have been long existent in his environment and heredity. That the causes operating to produce the conscientious objector, in time of war, are much the same causes that are operating at the present time, to produce the state of unrest, the condition of uneasiness, the lack of confidence in the government.

During the war about 300,000 males were classified as conscientious objectors. Thirty per cent were of military age. Many of these were given the privilege of noncombatant service. An indeterminate number went into the army, without demanding exemption under the law, but harboring in their hearts a resentment against military discipline. An uncertain proportion, not satisfying the requirements as desirable for military service, remained at home, a disturbing element.

A large majority, strange to say, were native-born Americans. A psychological report of the Surgeon General's office, comprising 720 cases in seven different camps, showed 10 per cent to be foreign born,

90 per cent American born, one third of which were of American parentage. The objectors are divided into two general classes—the religious and the non-religious objector, the latter including many of the so-called idealist type. The author further brought out the fact that the objector was by no means confined to those called upon to don the uniform, but were to be found in all walks of life. These were a self-centered and egotistical class. They did not so much object to war with Germany as they did to being allied to certain countries. There were found individuals of foreign birth enjoying the full benefit of American citizenship who looked with a sort of Pharisaical contempt upon their adopted country.

Another type is referred to, and is styled as the unconscientious objector, who is neither religious nor conscientious, but who merely use their conscience as an investment, the most obvious type of the coward and slacker. They masquerade as patriots, but really have an active hatred for all that the patriot loves. This is regarded in many cases as a morbid mental state, a diseased natural instinct, a close kin to the condition known as Sadism or Masochism. The psychological concept is advanced that in these cases the sentiment of fear is repressed, that is, it becomes subconscious, but appears in conscience under the guise of apparent hatred, or it may be in a religious guise. The writer sums up by saying that the term conscientious objector has been in a fair way to bring conscience into disrepute. If we are to regard conscience as a sacred faculty, as it would seem to be, then one is inclined to feel a contempt for a so-called spiritual faculty that operates only to secure for its owner preferential treatment. Continued residence in any country is held to be a tacit agreement to obey its laws, and if a man cannot for conscientious reasons defend his country, he cannot for the very same reasons participate in benefits earned by methods which his conscience condemns. If conscience comes in conflict with the law of the land, it should be regarded as a diseased conscience and not obeyed. Conscience, which as a plea is not needed in a court of law, should carry no more weight when used as an excuse from war.

The individual citizen has committed the conduct of the nation's affairs to the government, and whether the government acts, as he thinks, wisely or unwisely, his obligation and duty as a citizen is to acquiesce in that judgment. [Author's abstract.]

Schmidt, Ad. Night and Sleep in Disease. [Deutsche Ztschr. f. Nervenh., Vol. LX, p. 58.]

In sleep the function of the cerebrospinal system seems wholly eliminated, while the visceral system apparently pursues its activities undisturbed. The author uses the word apparently advisedly because in reality the breathing, as well as the pulse frequency, is influenced in sleep. In regard to the influence of sleep on symptoms in the cerebrospinal

system, it is stated that those pathological phenomena which are due to the irritation of the highest centers are, like the normal functions of these centers, usually reduced or suspended in sleep. In the light of recent research the muscle tonus must be regarded as an active cerebral contraction and not as due to a state conditioned by the sympathetic system. In some cases, when this natural tonus due to cerebral activities vanishes, together with the hypertonus, due to overirritation of the motor apparatus, pain may suddenly increase, because the position of the limb is lost which partly averted the pain, with the consequence that the patient awakens again as soon as he loses consciousness in sleep. The involuntary movements also belong to the category of symptoms which disappear in sleep, such as choreatic movements, tremors, paralysis agitans, etc., but there are frequent exceptions to this rule, and sometimes symptoms make their appearance only in sleep. In tetanus there is no yielding of the muscle rigidity in sleep, which is explained by the theory that the spasms do not depend on a state of excitement of the muscles but on a shortening of the muscle plasma in rest. It is well known that epileptic convulsions, concerning the cortical origin of which there can be no doubt, occur, in the majority of cases, during the day, but that in some instances they make their appearance only at night. This independence of the phenomena connected with epilepsy of the conscious or unconscious state of the individual is adduced to prove the somatic foundation of epilepsy, and is an important means for differentiating this disease from hysterical conditions. There are some symptoms which during the day are not apparent because the attention is directed from them by other activities; of this character are slight psychotic disturbances, anxieties, compulsory ideas, etc., as well as dreams which may be regarded as excitements evolving in the subconscious. The symptoms of the visceral nervous system are often exaggerated during sleep. It may, therefore, be stated as a general rule that those symptoms which depend on the most highly ordered nervous centers, hysterias, etc., vanish most readily in sleep, while the symptoms only loosely connected with the central nervous system are less influenced thereby. But there are, nevertheless, a whole series of symptoms depending on the relation of the muscles and the rest of the body on the horizontal position and on the exclusion of the impressions of sense, which only make their appearance in the conditions connected with sleep. In conclusion, the author states that his observations accord with those of Klewitz, that the extrasystole activity (aside from that which only takes place accompanying movements) does not vanish in sleep, and he raises the question whether this fact should not cause physiologists to hesitate to ascribe a purely functional origin to this phenomenon. [J.]

Brun, Rudolf. Instinct in the Light of Modern Biology. [Schweizer Archiv f. Neurol. u. Psychait., 1920, Vol. VI, No. 1, p. 80.]

Since the psychology of animals, the theories of inherited mnesic tendencies, of the inner secretions, and of the unconscious have been placed upon a scientific foundation, the problem of instinct has ceased to be a mere question of philosophy and has become the central problem of general biology. The author defines instinct as a manner of reacting which is hereditary in the nervous system and is set into operation by specific situations of stimulation, the responses being fully autonomous. Dynamically instinct represents the functional side of the hormone, the general energic original principle of living substance. The instincts, as the functional forms of the hormones, integrate in accordance with the program of life latent in a hereditary mnesic plan and determine the total activities of the individual in his life in the sense of a development into an objective final whole, and these functional forms of the hormones represent, during the successive stages of development of the said program, the most important interest of the individual in the relation to the environment, this interest changing with advancing development. The complex instincts of the higher animals (especially man) are preserved in the form of general predispositions to act in a certain way, while the detailed expression of these tendencies is for the most part left to the guidance of embiotic (plastic) experience of the individual in his environment. The "freedom" of individual development is, however, only apparent, because the inherited instinctive disposition exercises a far-reaching elective influence on the acquired memories in the sense of an affective censorship, so that really only that part of experience is used as guide for action which is in direct line with inherited instinct. The classification of instincts is made according to their importance for life, namely, into the instinct of self-preservation and that of preservation of the race. The setting into activity (ekphoria) of instincts is normally dependent on complex situations which contain the following components: (1) Interoceptive conditions, namely, biological conditions (the development of the inner secretory glands and the adequate central and peripheral organs), and biochemical conditions (activity of the inner secretions, and stimulation of the hormones). (2) Exteroceptive conditions (the concurrence of specific, simple or differentiated, sensory stimulation leading to realization of the instinct). If one of the partial phases in the total instinctive life of the individual is wanting, the instinct is diverted into a more or less abnormal path. There are simple repetitions of the instinctive actions which have met with obstacles, *i.e.*, a retrograde anachronism of instinct; or there is a leap over the non-realizable phase, *i.e.*, an anterograde anachronism; or there may be the adoption of a surrogate, or a transference of energy into some foreign activity, leading to the compulsory acts of neurotics; or a conflict may

arise between two instinctive interests, and then one of the two mnesic stimuli will be thrust back through the law of reciprocal repression. It is usually the more primitive, phylogenetically and ontogenetically older instincts which are checked with resulting reinforcement of later developed tendencies, *i.e.*, sublimation (Freud) or "agglutinated causality" (v. Monakow). Instead of reciprocal repression, however, there may be a compromise between the two conflicting instincts. The pathology of instinctive life may be divided into the primary or endogenous hormopathies, that is, disturbance of the instinct through congenital defects of the organs of inner secretion or through primary disturbances of inner secretions leading to constitutional psychoses; and secondary or exogenous hormopathies, that is, disturbances of the hormone metabolism through toxic influences, or disturbance of the outlet for instinctive activity and consequent feeling-toned complexes, leading to the psychoneuroses. [J.]

Stern, Erich. The Uniformity of Human Experience. [Jour. f. Psychol. u. Neurol., 1920, Vol. XXV, p. 105.]

That uniformity itself is a problem has only been recently recognized. Marbe found that in association tests a great number of individuals react in the same manner, and that persons from the same stratum of society, or from the same family, or from groups engaged in the same pursuits, are more than a sum of individuals—that they possess what might be called a soul or personality, or common will. The author finds the cause for this uniformity of psychic experience in the uniformity of feelings. Feelings are those conscious processes which inform human beings when an event is advantageous or disadvantageous for life. There are only two groups of feelings, pleasure and pain. These processes show great uniformity, which is explicable on biological grounds. All other emotions are of secondary nature and are more or less the products of culture. But they serve the spiritual and cultural needs of humanity, and it would be erroneous to limit the processes important to life to those which affect the preservation of the body. In the opinion of the author, the development of religious and cultural ideas show sameness even in nations far removed from each other in space and time because the experiences belonging to them represent definite emotional impulses in human beings. The same is true generally, even when the impulses at the foundation of the ideas are less evident than in religious and allied processes. If to a certain stimulus word another definite word emerges with great regularity, this is because there is an emotional connection between the two ideas. We see, therefore, that the essential explanation for the uniformity of spiritual experience is the uniformity of emotions, and we find the foundation for the uniformity of emotions in their biological significance. [J.]

Peritz, Georg. Psychopathology of Arithmetical Computation. [Deutsche Ztschr. f. Nervenh., Vol. LXI, p. 234.]

Everyone who has treated patients with brain wounds is impressed by the frequency with which wounds here localized are accompanied by disturbances of the faculty of computation. On the other hand, few cases of this sort are cited in connection with diseases of the brain and with congenital weak-mindedness. In a neurological convention the author offered a case of amnesic aphasia accompanied by pronounced disturbances of the faculty of computation. Liepmann made the observation that this disturbance usually accompanied motor aphasia. Other writers mention cases in which hemianopsia was present with disturbances of the faculty of computation, but offer no examples in support of Liepmann's view. According to the opinion of the author, disturbance of the faculty of computation is not a pronounced symptom of motor aphasia, but it may arise in this connection in those suffering from brain wounds, if the wounds are sufficiently extensive. In the present article the author limits himself to disturbances of computation connected with wounds of the occipital region and with hemianopsia, and arrives at the following conclusions: There is disturbance of the faculty of computation in injuries of the occiput only when the left brain half is injured; where there is injury of the right side the capacity is intact. Where there is an extensive bilateral wound there is serious disturbance of computation, but this does not seem to be the case where there is bilateral hemianopsia of only the lower quadrants. The center for arithmetical performances seems to be situated in the left gyrus angularis. There is a functional relation between the arithmetical faculty and the optic system, so that it may be assumed that the faculty of counting receives support from the visual regions even when the individual does not belong to the visual type. The ideas of form are not always disturbed together with the capacity of computing. It must therefore be assumed that these two faculties are not inseparably connected, of which further evidence is the fact that good mathematicians are often not clever at doing sums in the head. Where there is disturbance of the ideas of form, optical disturbances of other sorts cannot be inferred from this fact alone, and it would seem that in the optical region there is great differentiation of faculty. The disturbances of the capacity of computation are perceptible in the time it takes to do sums and in the inaccuracy of results. The retardation of the processes are associated with disturbances of comprehension, understanding, and concentration. The inaccuracy of results is also affected by the same causes. [J.]

Reichardt, M. Theory Concerning the Soul. [Journ. f. Psychol. u. Neurol., Vol. XXIV, p. 168.]

The brain is the seat of many vital processes, but only a part of these enter into subjective consciousness, and an unbridged chasm exists

between certain of the life processes in the brain and those conscious phenomena which constitute immediate inner experience. In the opinion of the author the real motive force of life is not a quality inherent in the psychic factor, but one dependent on a fore-psychic central station of the highest order. Consciousness is to a certain extent an instrument of the central station, thus serving the organism in its relations to the environment and in the performance of purposeful activities. This station, however, is central, not only for the psychic activities, but also for the entire physical organism, inclusive of the vitally important vegetative nervous system, controlling the spontaneity and purposeful self-direction of all the phenomena of life. From it proceed the impulses of the psychic sphere, of the emotional life. Attention and appetite, too, are properties of the fore-psychic processes. What is called soul, therefore, in the original sense of the word, is an ultimate property of the fore-psychic vital phenomena whose unity is the result of the entire centralized vital forces. Referring to the anatomical side of the problem, the author gives a schematic representation of this central process in relation to the other mental processes, stating that the psychic phenomena proper, the psychosensory, mnesic and associative processes, are localized in the brain cortex, but that this higher central station has its localization in the brain stem, as has also the vitally essential central vegetative apparatus. The central gray matter seems to be a specially important region for the psychic central function as well as for the vegetative element; that is to say, the inner lining membrane of the brain stem toward the third and fourth ventricles. In psychology it is customary to make a distinction between intelligence and character, between mind and soul. The author assents to this distinction, but goes a step further and assumes a separate special localization for these qualities, and brings the soul into relation with a definite portion of the brain, *i.e.*, the brain stem. In proof of this view, he emphasizes the astonishing unity and harmony of normal mental life and adduces the fact that mental diseases, such as dementia praecox, manic depressive insanity, paranoia, etc., are not in the strict sense due to loss of intelligence, but are disturbances of the vital central function. [J.]

Wedekind, Arnim W. Psychic Infection. [Journ. f. Psychol. u. Neurol., No. 22, p. 185, and No. 23, p. 1.]

The studies of the author were made on six groups of cases: 1. An epidemic of anxiety in a fortress guard after the suicide of a soldier. 2. Induced paranoia by contagion from a daughter to a father. 3. Epidemic of religious insanity with incest. 4. Epidemic of twitching spasms in a laundry. 5. Contagion of twitching spasms with unconsciousness. 6. Schizophrenia in various members of a family. In the author's opinion the material here gathered, tends to prove that purely mental contagion may produce effects which render practically healthy

or even entirely healthy persons unfit for work, and under certain conditions dangerous for the environment. A sharp distinction between psychic infection, in the sense used by many writers, and induced insanity, is not warranted, as the differences are only of degree and not of nature, there being gradual transitions between strong suggestion, the psychic infection of single symptoms, and the real disease of induced insanity. The author emphasizes that there should be greater effort in the direction of prophylaxis against psychic epidemics. At the first sign of an outbreak (for example, in a factory) the source of infection should be immediately removed and treated. Physicians and persons in administrative positions should be informed concerning the importance of suggestion on the masses, and adolescents should be given opportunity to observe simple examples of effects of suggestion. [J.]

Busch, Alfred. Sensitiveness to Alcohol of Individuals with Brain Wounds. [Journ. f. Psychol. u. Neurol., 1919, No. 24, p. 53.]

The author undertook experiments with nineteen individuals with brain wounds and five normal individuals as controls. The test used was the addition of numbers of one place according to the method of Kraepelin. The results are summed up as follows: The paralyzing effect of 13 gm. of alcohol was much greater on the wounded individuals than on the others. In some cases the performance was one fourth less than when no alcohol had been taken. The initial exciting effect of the alcohol was very perceptible in those patients who were able to perform mental tasks, but were lacking in volitional initiative, the alcohol acting as a spur to replace the deficient will force. In general, the well-known change from the initial exciting to the paralyzing effects was more apparent than in normal persons. Repetitions of these alternating periods of excitement and paralysis after a single administration of alcohol was a noteworthy characteristic in these patients. The early appearance of the paralyzing effects may be regarded as evidence of extreme susceptibility to the effects of the alcohol, and there was a positive correlation between the mental fatigability and this susceptibility, which has probably sufficient generality to permit its use in making judgments concerning nervous and pathological borderline cases. [J.]

Wright, Harold W. Post-bellum Neuroses. [American Archives Neurology and Psychiatry, April, 1920.]

The author had the opportunity to study war neuroses at the special hospitals in France and at the front. Recently he has been special examiner for the War Risk Insurance office and the Federal Board for Vocational Training, and has thus been seeing the aftermath of war neuroses among both American and Canadian discharged soldiers. Those patients who present the most pronounced symptoms from the point of view of vocational disability are men who served under the British and for long periods of time at the front, often not being sent back early

enough, and when sent back not given early special treatment. Some of these had been "blown up," others had carried on in spite of nervous exhaustion until the armistice, when acute symptoms developed. The scarcity of post-bellum neuroses, as compared with neuroses during the war and the large number of those who during the war were treated early and returned to duty, shows the value of early diagnosis and treatment, which should be made more available in handling the neuroses of industrial life, instead of letting such patients drift about and be made the subject of many and diverse diagnoses and unwise suggestions.

The author classifies the post-bellum neuroses for convenience into five groups: (1) Primary neuropathic and psychopathic states aggravated by the strain of army life; (2) secondary neurasthenic and psychasthenic states, secondary to an emotional complex or secondary to some physical disease, particularly to tuberculosis, amoebic dysentery, disturbance of the thyroid, myocardial degeneration; (3) patients simulating illness or exaggerating trivial complaints and attributing them to military service because of general discontent or the hope of pecuniary advantage; (4) uncured hysterical symptoms; (5) chronic residual symptoms of intracranial injury.

Each group is discussed and conclusions drawn and three cases are reported in detail. One of the reported cases is a striking illustration of the effects of prolonged anxiety and fear while under fire, and subsequent humiliation because of this fear, reaction upon a hyperconscientious, sensitive man who tried to "carry on" in spite of his fear, but because of an unreconciled and poorly rationalized attitude after the war was unable to meet his fellowmen with confidence or to apply himself to his former work. Explanation of his symptoms and a brief analysis of his conflicts helped him to recover self-respect and confidence. The author advises against attributing every symptom following a head injury or concussion to organic causes, and remarks on the comparative scarcity of cases with complications of head injury or cerebral concussion. However, such cases are being seen and their prognosis must be guarded, because their disability is apt to be prolonged for two or more years, even though no focal lesion can be demonstrated. [Author's abstract.]

Gerson, Adolf. Concerning Discharge of the Contents of the Body. [Neurol. Centralbl., 1919. March 16. Vol. XXXVIII, No. 6, p. 178.]

The contents of the body are discharged under strong emotions of fright, anxiety, expectation, in the moment of death. The contents of the bowels and bladder are voided, there may be vomiting, sweating, bleeding of the nose, erections, flow of tears, and, where there is exhaustion or other nervous disturbance, the nails, hair, teeth, or surface of the skin may be lost. The attempt has been made to explain all these

phenomena as the result of a chance irradiation of nervous energy, in analogy with the purposeless accessory movements that sometimes accompany unskillful efforts to manipulate new tools, etc. The author finds this explanation very inadequate, because whatever is found related in the animal organism has been brought together by millions of years of natural selection to serve some purpose. If one sort of energy releases another it must be because the two energies coöperate for the accomplishment of some activity destined for the preservation of the organism. A considerable part of the energy in living beings is consumed in assimilating and transporting new matter for the use of the system, and these functions make specially heavy demands on the nervous system in the higher organizations. When the organism is suddenly exposed to new demands, as when life is threatened, all the nervous energy is consumed in the new adaptation, and there is none available for the purposes of the so-called vegetative nervous system, from which it is consequently withdrawn, with the result that all the material which unnecessarily burdens the circulation is forthwith expelled. Discharge of the contents of the body, then, in the opinion of the author, is to be regarded as a function of the organism acquired by adaptation and inheritance, and probably depending on an inherited nervous tendency. Thus regarded, the use of blood-letting, purgatives, etc., as therapeutic measures in exhaustion, fainting and mental disturbances is not illogical. The question whether there is a special apparatus in the central nervous system for discharging the contents of the body, or whether this function is connected with the trophic apparatus of each organ, the author leaves open. He leans to the opinion, however, that there are no special trophic centers nor centers for expelling the contents of the body in the central nervous system, but that the trophic functions of the central organs is so closely connected with those of the peripheral system that the slightest change in the former immediately produces an alteration in the trophic function of the separate organs, with the result that the phenomena called discharge of the contents of the body immediately follows. [J.]

Mayer, André. Influence of States of Consciousness on the Secretions. [Journal de Psychologie, 1920, Vol. XVII, p. 121.]

It has long been known that states of consciousness, such as the image, etc., may influence all sorts of muscular contractions, but only within the last twenty years has attention been given to the effect of consciousness on the secretions. From a study of glandular reflexes accompanying states of consciousness the author sums up the following facts: The states of consciousness influence each other in two different ways, that is, certain substances are capable of exciting the sensory nerve terminations, producing mental states, and this excitation is followed by certain secretory reflexes. When the mental states reoccur,

the secretory phenomena are also again manifested, and thus a state of consciousness becomes connected with a secretory reflex. In the second mechanism certain ideas set an emotion into activity, which in turn is accompanied by certain secretory reactions; in this case the emotion itself acts as an excitant for the gland. But whatever be the mechanism by which connection between the state of consciousness and the secretion is effected, once established, it is never destroyed. In the formation of these connections, three stages may be distinguished: for example, an object, a piece of food is physiological stimulant of the secretion. A certain taste is perceived, and this perception is connected with the reflex glandular excitation. But the object has other qualities also, color, size, etc., and these qualities are associated with the same gustatory perception. Whenever any of these qualities formerly connected with the cause of the stimulus reoccur, they evoke the stimulus again, and the secretion follows. The conditioned reflex of Pavlov represents the second stage. Finally impressions which are conventionally connected with one or the other of the exciting states represents the third stage. Thus it may be seen by what a marvelously adaptable mechanism the images and secretions are associated, as it were, permitting the secretions to form connection with the most different states of consciousness. The power of stimulation belongs primarily then to a physiological excitant, but it passes on to other states which are normally associated with the primary stimulus and then to the images of these states. So that finally it is transmitted to impressions which are only occasionally connected with the primitive states of consciousness, and even to conventional signs, as language or written signs, which are thenceforth capable of the same stimulating effect. Thus little by little along the chain of images is transmitted the exciting power, extending progressively the relations between the secretions and states of consciousness. [J.]

Prantl, Rudolph. EXAMINATION OF SUGGESTIBILITY BY MEANS OF BINET'S SECOND "CATCH" LINE TEST. [Journal f. Psychol. u. Neurol., 1920, Vol. XXV. p. 133.]

Binet's second test for suggestibility consists in having individuals draw lines after models, so arranged that a certain number of lines increase in length, suggesting that all go on increasing, while in reality "catch" lines are interspersed by which the persons examined are misled according to their degree of suggestibility. The guiding thought is "The lines all increase in length." The author tested the system on fifty children from ten to sixteen years of age, comparing the results with Binet's tests, and then varying the experiments in a sense contrary to the first arrangement or under distracting conditions, such as with materials of different sorts, etc. He comes to the conclusion that the second Binet "catch" line test is not adapted for estimating individual

suggestibility, as Binet believes. While it stimulates a reaction of automatism, it also stimulates a distributive orientated suggestibility and, indeed, more forcibly than is the case with the first reaction. The real value of the test consists in the light it throws on the development of suggestion, and beside the intensity, it also reveals the nature of the suggestibility, permitting the persons examined to be ranged in one of the fourteen modifications which could be distinguished from comparison of results. The curve of kinds of suggestibility ran from ultrasuggestibility at one extremity over the neutral point to antisuggestibility, the first kind representing those conditions where a suggestion personally given is effective in a waking or hypnotic state, and the last those where there are fixed insane ideas. The author was able to show that the nature of suggestibility as revealed in this simple test corresponded very well with the character of the persons examined. The possibility cannot be denied that scientific pedagogy may some day be able by a few simple tests to determine the whole character and susceptibility to influence or teachableness of children. The principle that the human mind has a much greater capacity for grasping changes than for seizing the unchanging was illustrated by the tests. It was also shown that there may be a summation of energy of the guiding thought, in the sense that the suggestion remains latent but constantly gathers tension until it breaks forth with great force. [J.]

Norman, H. J. Stress of Campaign. [Rev. of Neur. and Psych., Vol. XV, Nos. 8, 9.]

With every national upheaval there are associated emotional crises which are the evidence of the effect produced upon the nervous system, especially of those who are unstable. It is to the emotions—primarily at least—that appeal is made. The symptoms or the degrees of response will depend very much more upon the individual who is subjected to the stress than upon the particular stress; and they will vary in the individual relatively to the degree of susceptibility of the different portions of the nervous system. This susceptibility may in turn be due to inherent defect, or may be the result of acquired degenerative processes, such, for example, as those brought about by alcohol and syphilis. The exciting factor is important, but still more important is the condition of the organism upon which it acts. The World War apparently produced no new nervous or mental disorders. It has increased the number of such cases, and has thus caused some of them to be brought to the attention of many observers who would not in the ordinary course of events have taken cognizance of them. The difference is thus more in the perspective from which they are regarded than in the conditions themselves. Research is tending to demonstrate that even emotional shocks are accompanied by changes in the brain cells; or, rather, the emotions are really *commotions* in the cells. They are responses to stimuli. The difficulty

in realizing this lies in the fact that the response is not proportioned to the amount of the stimulus, but to its character. Many nervous disorders, *e.g.*, types of "shell-shock," as found in the County of Middlesex war hospital, resulted from fear, emotional strain and nervous tension. With loss of control came terror and apprehension, tremors and movements for protection; sleep became disturbed and terrifying, and accompanied by frightful dreams. Mutism or deafness or auditory hallucinations sometimes occurred. The superficial and the deep reflexes in these cases may not show any alteration worthy of note. Generally, however, the tendency is towards exaggeration. Even in the hemiplegias and paraplegias, which are not due to gross interference with the central nervous system, the reflexes are of the "functional" type; although there may be, for example, a Babinski sign in certain cases which alters to the plantar type as improvement takes place, illustrating the difficulty of dogmatizing as to whether the condition is "functional" or "organic." Rombergism is not unusual; as a rule it is, apparently, a part of the general tremulousness and loss of muscular tone which are such prominent symptoms. The pupillary reaction is frequently brisk, and the pupils may be dilated.

The ordinary manifestations of hysteria, such as monoplegias, paraplegias, and hemiplegias, with or without sensory disorders and muscular contractures, affections of the special senses, etc., are not infrequent, and are certainly met with more often than at ordinary times. Mental disorders and disorders existing in other parts of the nervous system merge one into the other indefinably. So classification is difficult. Where mental symptoms were predominant such cases were described as suffering from mental disorder. Perhaps the most characteristic mental state observed among those exposed to stress of campaign is one of confusion. This varies in different cases—or in the same case at different times—from a condition where the mental processes are apparently quite chaotic, to others in which it resembled more a condition of day-dreaming. In the more pronounced examples there is incoherence of speech, inability to understand questions, defective memory, disorientation; the patient is unable to concentrate his attention or occupy himself; he may wander restlessly about or sit staring vacantly. Some of these patients are extremely emotional—weep when spoken to, are melancholic, childish, and plaintive; and the occurrence of depression along with confusion is more frequent than is usually to be observed—indeed, the ordinary melancholic patient is comparatively little impaired as to memory and orientation. For the most part these symptoms clear up in the course of a few weeks; the general health—which has been in most cases poor—improves, and a good recovery takes place. Where stupor has been present recovery may not be complete. Deterioration if present would be of practical account in proportion to the extent of the patient's occupation along mental lines—less to the laborer than to the college pro-

fessor. The confusional state may be brought on rapidly by some such drastic disorganization of cell structure as that resulting from a shell explosion. Again, the absorption of CO gas may have exerted a prejudicial action through the blood stream on the cerebral tissues. It is conceivable, therefore, that the defect is due either to a diaschizis—a retraction of dendritic processes—or to cellular deterioration. Many cases of mania occurred, of all degrees of severity. A majority of these cases have had wounds or injuries of the lower limbs. Maniacal symptoms have been associated in several cases with trench-foot or with frost bite involving the toes. Melancholia has been of frequent occurrence, closely conforming to the usual clinical types. Wounds and stress were often associated as causative factors of melancholics. A few cyclical (manic-depressive) cases were found. One of the most striking features of the cases of mental disorder has been the frequency with which suicidal attempts have occurred. It is not possible yet to give any reliable statistics as to these attempts; but that they have been more numerous than in ordinary experience seems to be certain. The method most usually adopted has been that of cutting the throat; and the number of attempts in this way is far in excess of all others. For the most part the razor has been the most favored implement, though knives and pieces of glass have also been employed. In one case, where the throat had been cut by means of a razor some months previously, a further attempt was made by means of a sharpened piece of tin. It is almost incredible how badly the throat may be gashed and yet a fatal result not be brought about. Indeed, it is the exception. When one of these attempts has been made by means of cutting the throat there is not usually another endeavor in the same way. This is not by any means so where strangulation is the method chosen; many and determined efforts may be made, and such cases are, therefore, an even greater source of anxiety than is the usual suicidal patient. Shooting has very seldom been the method chosen. Suicidal attempts occurred most frequently in hot weather. Attempts were sometimes made by soldiers in conditions of acute alcoholism, or following it. A certain number of unfit—some congenitally so and others deteriorated by stress—directed their energies upon self-destruction or upon some sort of mutilation to avoid further service. The most interesting feature of cases of general paresis is that apparently the average age at which the symptoms are noticed has been lowered. Those definitely diagnosed have conformed to the ordinary types. Alcoholic excess had an influence in complicating the matter of diagnosis of mental disorders, as well as inducing suicidal attempts. It was a potent factor in bringing about mental disorder; and in addition to the more acute cases where alcohol is the chief factor in upsetting the balance there have come under observation others exhibiting the symptoms of chronic alcoholic insanity. These have been for the most part among the older men—frequently members of the Labor Battalions—

many of whom doubtless had the condition fairly well developed before enlistment. Also, when one considers how greatly periods of stress increase the demand of the nervous system for some exogenous stimulation, it is easy to conceive that alcohol has exercised no slight effect in this campaign. Among the mentally defective there occurred, as was to be expected, attacks of insanity of varying degrees of acuteness—mania, melancholia, and confusion. These conditions obscured for a time and in certain cases the underlying defect which only became apparent when the acute symptoms passed off. The various forms of nervous and mental disorder encountered required in a general way rest, diet, tonics, etc., to improve the general health; later, work in the open air. Practically all the cases of neurasthenia and psychasthenia recovered under ordinary methods of treatment. Patients with mental disorder were similarly treated, after segregation, etc. Psychoanalysis and certain methods denominated by the author as pseudo-scientific were frowned upon. [C. E. Atwood.]

Prinzhorn, Hans. Artistic Creation in the Insane. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. LII, p. 307.]

Recently a museum was established for pathological art in the psychiatric clinic at Helderberg to contain material from the institutions of Germany and Switzerland. The author gives a historical review of the study of art in the insane and outlines the points concerning which it would be interesting to obtain data. The French were the first to study this feature of insanity. Tardieu in 1874 called attention to the fact that the drawings of the insane differed characteristically from those of normal persons. In Germany Fritz Mohr in 1906 was the first to call attention to the subject. He analyzed the complex act of drawing into its elemental components and was of the opinion that from drawings, material valuable for psychiatric diagnosis could be obtained, because of the insight given into the mechanism of the will in the motor impulses; because of discoverable evidences of catatonic symptoms, and because of revelations of associational disturbances. By later writers Freud's method of interpreting the symbolism was applied in the art productions of the insane, for symbolism was found to be the mode of expression in delineation as well as in speech. Schlider emphasized the schizophrenic picture of life as an overdomination of affective tendencies expressed in wish-fulfillment phantasies at the expense of the cognitive concepts, and his chapter on "Völkerpsychologie und Psychiatrie" gives suggestions which throw light on the artistic creations of the insane. Thus may be traced the growing realization of the significance of the artistic creations of the mentally unbalanced. At first these productions were only described as interesting facts. Later the act of drawing was analyzed as having diagnostic value, and at present answers to questions lying far beyond the diagnostic sphere are sought in these artistic creations—

questions of æsthetic values, the meaning of genius, etc. "What is the meaning of the constantly recurring forms and colors?" is asked. "Is there an alteration of the perception of the external world at the foundation of these productions, or are the strange transformations made in conformity with impulses from within (hallucinations, etc.)? In what way is the æsthetic sense changed (inclination to grotesque, comparison with work of sane artists)? What parallel is there between the drawings of children and those of idiots?" It is impossible to answer these questions directly. A methodology for approaching the subject which takes into consideration the psychology of drawing, the theories of expression generally, and the origin of art must be evolved and a simple terminology must be invented; for the most important requisite for an analysis of this sort is a pregnant and exhaustive technique of description, by means of which alone the true nature of the subject can be revealed. [J.]

Neutra, Paul. PATHOGENESIS OF THE NEUROSES. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. LII, p. 129.]

The pathogenesis of the functional neuroses, as disturbances of the psyche, the author understands as follows: The primary point is the will, recognized as consisting in a unity of idea and action; even empirically a priority and superiority of the psychic factor is assumed, for it is conceded from observation that there is no action without motivation. The author subscribes, in the main, to the psychology of Schopenhauer, who says: "The motive is a stimulus which must take a circuitous way through the brain, where, under its influence, an idea arises, and this idea it is which is the cause of the resulting action." If the action normally results from the motive and the construction of an idea, then it is certainly not surprising that abnormal active effects should flow from the same source, in pathological cases. The normal will is bound up with, and acts through, the organ or medium of knowledge, *i.e.*, through the central nervous system. The abnormal will, as observed in the hysteric, acts independently of the medium of knowledge (the author refers to the objective or metaphysical will). As presupposition of this condition, a congenital inferiority of the "medium of knowledge" must be assumed. This functional insufficiency is revealed in an alteration of causality, in the sense that the metaphysical will, because of the weakness of the "medium of knowledge," no longer acts from motivation, but from simple stimulus, therefore through the regions surrounding the medium of knowledge (the central nervous system). This form of simple reaction is the form of causality or will which Schopenhauer ascribes to plants, and in the case of hysterics the vegetative nervous system is the organ in which the causality takes place. In the hysteric the psyche is therefore permanently changed in a very essential manner. This lower form of causality is solely under the control of the affects.

The functional insufficiency is further betrayed by an inferior manner of forming ideas which, as a predisposition, precedes the actual onset of the neurotic disease by a long period. An hysterical symptom should not be accepted as "psychic" without some evidence of how a psychic symptom is possible. The psychic factor in hysteria can only be sought in disturbance of energy, or force, *i.e.*, in the will, which by the inferiority of the individual is withdrawn from the control of normal ideas. The "material" upon which the hysterical will acts in constructing the symptoms is derived from three sources, namely, (first) affects which formerly accompanied ideas and are recalled; and thus it becomes clear why the hysteric, afraid of war, produces symptoms really belonging to fear. The hysterical tremor is the physiological trembling normally accompanying anxiety, only out of all measure exaggerated; it is an uncontrollable innervation withdrawn from the inhibiting force of the motivated will—an hysterical somatic symptom which could not be imitated voluntarily. The second somatic material of which the hysterical will makes use consists in bodily ailments which are more or less contingent in nature, rheumatoid disturbances, flat-foot bowel trouble, eneurists, etc.—ailments which really exist but which are not deep seated and are readily overcome by those with normal "will to health." The third somatic material is made of the constitutional inferiorities and the hysteria, after passing through the first two series of symptoms, may become chronically fixed in some form of organ inferiority. These inferiorities exist in organisms which are otherwise called healthy, but only hysterics press these points of minor resistance into the service of the will which is out of touch with normal motivation. [J.]

d'Allonnes, G. Revault. The Higher Forms of Intelligence. [Journal de Psychologie, 1920, Vol. XVII, p. 219.]

The author distinguishes various forms of attention, beginning with simple sense perception (hearing, seeing) and ascending through apperception, in which the sense elements are recognized as objects by means of a mental schema, to conceptual attention (or understanding), in which concepts are employed to interpret what is observed. Between the more concrete schemas and concepts the principal difference is that the concepts are general schemas, or keys, so to speak, applying to definite groups, or facts concerning those groups, while the more concrete schemas (by means of which things are apperceived) are only particular or generic keys applicable to empirical classifications and limited to summing up mere sensible analogies. Concepts are abstract symbols, as algebraic symbols; apperceptual schemas are only concrete images simplified and therefore applicable to a number of singular objects. Further, the author distinguishes attributive attention (judgment), which consists in applying to a given experience already formed schemas, images, verbal symbols, of either analytic or synthetic nature, for the

purpose of deciphering the experience; and finally he distinguishes rational attention (deduction and induction)—a tri-conceptual act which consists in subsuming a minor term (a single object) under a major term capable of interpreting it. The author explains why logicians for so long a period overlooked the importance of the schemas and their nature as forms of intelligence, failing to see that the silhouette furnished by the shadow aids us to understand the object, as the rude horse carved in wood, or the outline on paper helps the child to understand the horse which draws the carriage. No object is deciphered until we possess a schema or schemas to apply to it: it is by means of our familiar schemas that we recognize single beings, thus assimilating them with others, or distinguishing them as separate, it is by means of veritable motor schemas, residues stripped of former tentatives, that we become skilful, that we have at our disposal various ways of manipulating things. So far as the author knows, Bergson alone renders full justice to schemas—dynamic schemas, he calls them, and defines them as intellectual attitudes, presenting in terms of becoming, *i.e.*, dynamically, that which the image gives in completed and static form. Attention should never be confounded with effort. Voluntary attention is often accompanied with effort, but should always be distinguished from it and often occurs without it. In attention a representation is isolated from all others because the organizing schema rejects the images which are incompatible with it and thus confers a veritable individuality to the actual content of consciousness, but this operation should in no way be confounded with mental effort; it is always performed without effort when unimpeded by insufficiency of quality of material and quantity of force to make combinations. For this reason the author does not agree with Bergson that there is a feeling of effort in proceeding along the path from schema to image. Attention is a mode of schematization, but it is not a mode of effort. [J.]

Kahn, Eugen. Psychopaths as Revolutionary Leaders. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. LII, p. 90.]

Psychopathic types among leaders of revolutions in the past are found by Kraepelin, Marx, Stelzner, Lombroso, and others. The author describes cases of this sort met with in the present political upheaval. He endeavors, from a small number of psychopathic revolutionary leaders (fifteen) who fell under his observation, to give an idea of the manner in which these psychically abnormal individuals become revolutionists and leaders of the masses. Four of these fere cases of moral inferiority; four more hysterical cases; four fanatic psychopaths; and three manic depressives. The impulses leading to revolt in these different types varies. In the morally inferior type, it is vanity and greed; in the hysterica, the desire to play an important rôle; in the psychopathic fanatics, the obsession to put through an idea with themselves in

the center of the stage; in the manics, the necessity of being active in a way to gain notoriety. These cases show, notwithstanding good, sometimes very good, mental endowments, lack of critique concerning their own personality and the task they are undertaking, as well as affective instability and volitional insufficiencies. The psyche of the real leader of men, the author states, is characterized by surpassing creative and critical intelligence, by indomitable will, and by complete control of emotion. Though ambition is often present in the true leader's character, it is held in check by his insight into his own character and the realization of his task. If the psychic qualities of the masses are contrasted with those of the true leader, it is found that two extremes are represented—the highest intelligence, controlled emotion, strong will, on the one hand; low intelligence, primitive, unchecked affectivity, blind appetite, on the other. Psychopaths such as the author describes stand psychically in close relationship with the masses. As true sons of the people, they know the coarse emotional effects which appeal to the masses whose suggestibility is so great that when these psychopaths utter the first cry it is followed blindly. This is particularly the case under the present conditions, the people being weakened by undernourishment and enervated by grief. If the new order of things results in a long-needed reformation of the laws, the author is anxious that the lessons which psychiatry has learned from the revolution should be taken into consideration. [J.]

Reichmann. TREATMENT OF HYSTERICAL SEIZURES. [Neurol. Centralbl., 1919, May 1, Vol. XXXVIII, No. 9, p. 298.]

The war has shown that there is a much greater tendency in the German people to hysteria than was previously supposed, and also that the signs which have hitherto been considered as exclusively characteristic of hysteria in differentiation from epilepsy cannot always be relied upon. The author suggests tests which permit the true character of the disease to be recognized. The patients are asked in their normal condition what caused their attack. They were then placed in an hypnotic state and the same question is put to them after it had been forcefully suggested that they should remember the exact conditions of their former seizure. The patients are then placed again in the situation of the first attack, and if the attack again occurs, the hysterical reaction may be overcome, with consequent recovery. An epileptic seizure cannot be produced by suggestion, and if, after attempts by various physicians, it is found impossible to reproduce the attack, it may be assumed that the affection is epilepsy. [J.]

Kretschmer, Ernest. HYSTERICAL DISEASE AND HYSTERICAL HABIT. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXVII, p. 84.]

The author discusses hysterical disease, hysterical habit, and malingering. Under hysterical disease he understands disturbances not directly

connected with volition, under hysterical habit anomalies where the patient, convinced of his disease, gives objective signs of it which it is possible to produce voluntarily, and under malingering those cases where an honest conviction on the part of the patient as to his own disease is more or less wanting. To the first class belong the true hysterical shaking tremors, spasms, real flaccid palsies, real false innervations. To the second class, hypochondriacal reactions, hysterical dysbasias, hysterical postures of the body. Hysterical pain is never disease of itself; it can only acquire the value of a disease through hysterical motor and psychotic disturbances accompanying it. The author divides hysterical individuals into the following four classes: the slightly weak-minded, those suffering from exhaustion or shock, infantiles, and, finally, degenerates. The real pathological character of hysteria is determined by the basic mental condition and by the gravity of the disturbances of consciousness. Not rarely the original hysterical disease is continued secondarily as a habit. The "will to health" is the inner personal attitude of the hysteric toward the disease. The author distinguishes the following attitudes toward health: the actively good, the negligently good, the negligently bad, and the actively bad. Pure hysterical habit, devoid of volitional effort in the direction of health, is an inveterate false attitude of the will called forth by error of judgment and established by long practice; it is a psychophysical process presenting all the essential characteristics of a real physiological condition. Where, therefore, incurability is associated with absence of volitional effort to recovery, betrayed in signs easily recognizable to the specialist, the opinion "hysterical habit with bad 'will to health'" should be rendered. Simulation without hysteria is rare, but the psychopath who reacts hysterically should not be encouraged any more than the psychopath who reacts criminally; he should be treated, but not pensioned. As soon as this principle is adopted it becomes clear that the boundary to be fixed is not between what is disease and what is not disease, but between what is hysterical disease and what is hysterical habit. [J.]

Storch, Alfred. Motivating Impulses of the Neurotic. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXVI, p. 66.]

The specific motivating forces of the neurotic type of character tend in two directions, a positive, *i.e.*, toward self-assertion and elevation, and a negative, *i.e.*, toward self-negation and suppression (striving for domination, for notice, for consciousness of personal value, to exaggerate personal good qualities and detract from those of others, on the one hand, or striving for pain and self-sacrifice on the other). The "true" character is often unrecognizable, because it is hidden by fictitious traits, which frequently take the form of neurotic devotion (false enthusiasm, false sympathy, false self-sacrifice and love, either for persons or things), and they may conceal the negative as well as the positive real tendencies

In these false emotions just those qualities are imitated which it is least possible for the neurotic to possess. The efforts which are typical of his character are all directed toward a modification of the personal attitude, and are, therefore, invariably connected in some way with the ego, even when, as in the striving for self-oblivion, they are directed toward annihilation of the ego. True devotion is something entirely apart from concern about the ego; it presupposes that all personal consideration, all thought for the ego, has been abandoned, and that the whole existence is wrapped up in a foreign existence without any backward glances at self. The inability to turn attention from his own personality and to fix it on another existence is the very basis of the attitude of the neurotic toward life. Feeling his own inadequacy, his whole striving is to free himself from this oppressive consciousness, and this liberation is sought in a pathological effort to modify the situations of life in reference to the ego. Neurotic striving thus presents two sides; when judged from the content its deeply stamped pathological character is perceived; when regarded in reference to the goal to which it is directed it appears in the light of an effort to overcome the pathological element—as a striving for recovery. [J.]

Rothe, K. C. The Stoic Philosophy as a Means of Influencing Stutterers. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXVI, p. 54.]

Stuttering is to a certain extent the resultant of a parallelogram of forces. Psychic as well as physical factors are involved and reinforce or neutralize each other. The author describes a psychic method he found effective in treating participants of the war whose speech, as result of exhaustion, hardships, wounds, psychic insults, had been affected in the sense of stuttering. To intelligent adult stutterers the author first gave an explanation of the mechanism of their difficulty, which, while not strictly accurate scientifically, placed a clear picture before their minds, as follows: for closing an opening a certain energy is necessary which may be said to equal x; to open it again the same energy in an opposite direction is necessary, equal to y; for smooth speaking the two efforts must equal x—y. If the closure is made with 10x, it cannot be removed with y, or 6y, etc. Therefore, when the clonic spasm closes the opening for speech, the effort must be made to open it with 2y, 6y, and so on, before 10y is reached, the result of which is stuttering. Next the effort is made to impart to the stutterer an attitude of indifference toward life—toward grief, if he has suffered much, or toward the smaller irritations of daily life, if he takes them seriously. Seneca, Marcus Aurelius, Epictetus, and Xenophen's "Life of Socrates" are chosen for his reading, and he is taught to analyze the emotional situations of life into their unimportance. To quiet his anxious fear of stuttering attention is called to the fact that everybody stutters occasionally. [J.]

IV. SOCIAL AND FORENSIC NEUROLOGY.

Horstmann, W. RELIGION OR INSANITY? [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. XLIX, p. 218.]

Having been called upon to give an opinion concerning a young man who refused to enter military service because of religious beliefs, the author discusses the grounds upon which expert opinions must be formed in such cases. The importance of an understanding of instances of this sort may be inferred from the fact that the patient received letters from a member of the same sect in Brooklyn, New York, stating that this member had been sentenced to twenty years of imprisonment because he refused service for the same reasons as those offered by the individual under the observation of the author. The physician, the author states, is not concerned with revealed religion. As he understands religion it is a condition of the inner life, the expression of the individual psycho-biological organization which, like the esthetic or moral tendency, is to be regarded as a factor in the personality. It is from this point of view that the physician must determine whether individuals with eccentric religious views are subjects for punishment or for treatment. He decides that in the case under consideration the psychiatrist is justified in seeing not merely a seeker for the ideal principle of a religion, but rather a man in whose character the influence of disease is reflected, leading to an overvaluation of the ego. It is particularly difficult for the psychiatrist to draw the line of demarcation between religious enthusiasm and paranoia. They have in part the same root, and in some respects their resemblance goes so far that expressions of psychiatrists and religious philosophers could sometimes be substituted for each other by simply changing the word "believer" to "patient." The prevalence of the affective element is the same in both instances and the incongruence. The dominance of the affective element is the same in both instances, and from the incongruence of affect and logic the judgment is in constant danger of becoming obscured. Religionists, like paranoiacs, have egoistic trends, and the degree of the overvaluation of self is in great measure a criterion for distinguishing pathological tendencies from religious enthusiasm. The author did not regard his patient as a paranoiac, however. There was no system of pathological ideas, for dogma is a natural way taken by both religion and science for constructing beliefs and theories. Yet a man of the nature of the patient is scarcely a subject for punishment. He is a man with very strong natural religious inclinations, a somewhat weak enthusiast with slightly elevated feeling of self-importance, and with a series of emotional-toned, hyperquantivalent ideas whose tendencies in thinking and feeling deviate from that of the majority—an eccentric individual with certain mystic proclivities. For the state sectarians of this sort are very dangerous, however, especially in war. They infect indifferent individuals, and their presence may lead to a considerable weakening of force in an army. As physician, it is

unavoidable to sympathize with them, but from a forensic standpoint it is necessary to punish them. [J.]

Sichel, Max. Suicide in the Field. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. XLIX, p. 385.]

The experience of former times that mental diseases increase during a field campaign, while suicide decreases, was confirmed in the present war. The decrease of self-destruction is explained by the enthusiasm for a cause which lends content to life and partly by the nearness of death which lends value to living. In a Bavarian Landwehr division occupying a comparatively quiet position on the front there were during the entire period of the war fifteen successful attempts at suicide. In all but three of these cases the history so clearly indicated pathological character that there could be no doubt as to the connection between the abnormal mental condition and the suicide. In the three remaining cases the histories were not obtainable. The motives for suicide in the field are almost without exception attributable to the situations to which the psychically inferior individuals are unable to adapt themselves. [J.]

Nolan. Criminals and Psychoses. [N. Y. St. Hospital Quarterly, May, 1920.]

This observer has investigated 646 first admissions to Matteawan State Hospital from 1912 to 1918. Of the 646 admissions 518, or 80.2 per cent, were males, and 128, or 19.8 per cent, females. Among the male patients 11.4 per cent were charged with disorderly conduct, and 26.4 per cent with vagrancy. Among the women 18 per cent were charged with disorderly conduct, 16.4 per cent with public intoxication, and 39.8 per cent with vagrancy and prostitution. These three groups comprised 74.2 per cent of the total female first admissions. The average age of the criminal insane appeared to be much younger than that of the civil insane. The criminal insane comprised comparatively few senile or arteriosclerotic cases; but include high percentages of alcoholic, constitutionally inferior, and mental deficiency cases, which together accounted for 38 per cent of criminal first admissions, compared with only 10.3 per cent of the civil. Homicides and assaults were committed principally by alcoholic, dementia precox, constitutionally inferior, and mental deficiency patients. Of those arrested for vagrancy or prostitution 8.5 per cent were senile, 15.4 per cent paretic, 13.8 per cent alcoholic, and 35.1 per cent dementia precox. Of 449 patients who had previously been committed to penal institutions 26.1 per cent had remained there for less than one month, 35 per cent from one to two months, 21.2 per cent from three to five months, 12 per cent from six to twelve months, and 5.8 per cent for more than one year. These facts appear to warrant the conclusion that a large part of the patients sent to penal institutions were insane at the time, and should have been committed to psychopathic hospitals or civil state hospitals.

Leahy, Sylvester R. Analysis of Cases Admitted to the Neuropsychiatric Service of U. S. Army General Hospital, No. 1. [Am. Arch. Neur. and Psych., August, 1920.]

Of the total number of 2750 patients received at this hospital, the former Messiah Home in New York, 24 per cent were psychoneurotics, 20 per cent of the dementia precox type, 12 per cent were classified as manic-depressives, 10 per cent as mental defectives, 5 per cent had organic nervous diseases, principally of the syphilitic type, 4 per cent were definitely epileptic, and 4 per cent were constitutional psychopaths. The hospital was an evacuation unit, but none of the cases appeared different from those encountered in civilian life, except that most of them had a military coloring. A close ratio was observed between the percentage of cases of dementia precox (20 per cent) in the army and in civilian life (27 per cent). In manic-depressive diseases the percentage was 12 in the army and 9 in civilian life. Comparisons between other groups is impossible because civilian state hospitals deal primarily with psychoses occurring at all ages and with unselected population. The great problem, both civilian and military, is seen from the classification to be that of the dementia precox group. [Stragnell.]

Mayer, K. E. Abuse of Hypnosis for the Simulation of Mental Disturbances. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. XLV, p. 269.]

The author reports the case of a man who was sent to the section for nervous diseases, suffering from disturbances connected with a swelling of the gums and a clouding of consciousness resembling that occurring in persons who find themselves confronted by some unpleasant event (end of leave of absence, imprisonment, etc.)—a condition which seems assumed voluntarily and with purpose. A letter to the patient from a comrade was intercepted, in which the latter asked patient to tell him when patient wished to be "put in the condition" to be helped from the fighting area. The author states that this was evidently a case where hypnotic influence had been used by another person to place the patient in a stuporous condition. Patient was not held in a continuous hypnotic sleep, but he was kept for weeks at a time in an abnormal mental condition which necessitated his treatment in the psychiatric section. The same condition was attained by hypnotism which in other cases is attained by autosuggestion, further proof that these states are not merely simulated. This experience of the author's shows that physicians must always be on their guard, where there are acute stuporous conditions, for a possible hypnotic origin of the same. The hypnosis permits the individual to sink into a dream condition at any given time, after which it is easy for the patient to prolong the condition in a stuporous state. [J.]

Stengel, W. The Artificial Sterilization of Women, from a Psychiatric Standpoint. [Archiv. f. Psychiat., 1920, Vol. LXI, p. 493.]

The question of sterilization being of even more consequence than that of the interruption of pregnancy, as the latter affects only a single individual, the former a whole generation; and decisions concerning this step falling with ever increasing frequency on the psychiatrist, the author discusses the cases of mental disease in which sterilization is indicated. In general it should be advised where mental disease previously developed in close connection with one or more former pregnancies, and where it is probable that the insanity will return under the same conditions, in such way as to endanger the future mental health or life of the woman. Discussing the particular forms of insanity in this relation, the author states, in regard to constitutional tendencies, that the original paranoid condition generally does not warrant sterilization, and in the manic-depressive group, as there is no evidence of actual connection between the mental disorder and pregnancy, sterilization should not be advised. In regard to other forms of insanity, he states that where there has formerly been depression, together with the "pregnancy complex," sterilization should be taken into consideration, and also where repeated pregnancies have shown the recurrence of exhaustion psychoses of extreme severity. In psychopathic forms of hysterical types, in view of the extreme liability of affect, sterilization should usually not be advised. In dementia precox it should generally be resorted to after the first impulse to the disease has occurred in a pregnancy. In epilepsy the procedure should be undertaken where the first seizures occur in pregnancy or tend to recur in this condition, or where the status epilepticus or epilepsy psychosis supervenes, and in every case of chorea gravidarum of any degree of severity. The author describes a series of cases in which sterilization was indicated, and the small percentage of cases in which the operation was undertaken shows an unwarranted hesitancy on the part of physicians to proceed to this step. A physician of course must act solely from a medical viewpoint, leaving out of consideration the social and racial hygienic problems, the solution of which are the task of the courts and legislators. [J.]

Sträussler, Ernst. Concerning the Problem of Simulation of Mental Disturbances. [Zeitschr. f. d. ges. Neurol. u. Psychiat. 1919, Vol. XLVI, p. 207.]

The opinion concerning the simulation of insanity has been considerably changed within the last ten years, as a result principally of the extension of the knowledge concerning dementia precox and the Ganser symptom, which revealed a whole symptomatology with the stamp of having been produced wilfully. The author describes a case illustrating the vanishing boundaries between simulation and real disease, which fur-

nishes a valuable contribution to the study of the origin of hysterical symptoms. Suspicions concerning the genuine character of the "stuporous" condition of the patient were awakened at the very beginning by his facial expression and by the content of his answers, especially the too great emphasis placed on "not knowing." But it soon became apparent that the diagnosis of malingering by no means covered all the symptoms. During the examination the author accused patient of contradicting himself and of showing that he was not so confused as he claimed. Immediately patient's face became stark and expressionless; he stared before him into space, the mouth open, would fix his glance on no object held before him and would answer no further questions. The conjunctival and corneal reflexes were found to be absent, as well as the gum and pharynx reflexes; he reacted in no way whatever when the point of a needle was thrust through the septum of the nose. All these conditions changed, however, as soon as the physician left the patient, and they did not reappear in subsequent examinations. The author finds probable explanation of the case in the circumstance that an hysterical constitution is at the foundation of simulation, and the affective and suggestive stimulus of the examination, therefore, gave an impetus to the hysterical "will to disease" which before had found expression only in pure simulation, so that a true loss of consciousness ensued. When the author requested patient to write his name, the writing showed the interesting disturbance macrography accompanied, as was expected, by micropsy. But as soon as the author left patient this disturbance, too, vanished. These phenomena could not be attributed to malingering. It would seem that as soon as the sluices which dammed back the slumbering pathological tendency were opened by suggestion, the psychotic symptoms poured forth; the simulation seems always to assume that type of psychic disturbance for which a natural tendency really exists. The author emphasizes the extreme complexity of the disease picture which may arise in simulation. [J.]

Kline, George M. Proposed Reorganization and Consolidation of State Institutions in Massachusetts. [Am. Jl. Insan., Jan., 1920.]

The Constitutional Convention, at sessions during the summers of 1917-18, proposed nineteen amendments which at a later state election were accepted. The last amendment adopted provided that on or before January 1, 1921, the executive and administrative work of the commonwealth shall be organized in not more than twenty departments. This requires the consolidation and reorganization of over one hundred existing state departments, boards and commissions into twenty divisions. To carry out these provisions, bills were introduced into the legislature which planned to coördinate state activities having somewhat similar functions and give the governor authority to fix responsibility. The

first bill contemplated establishing a Department of Institutions, to include the Prison Bureau with four institutions, the Commission on Mental Diseases with thirteen, institutions under the Board of Charity numbering twelve, and the Commission on Probation—four distinct departments and twenty-nine institutions. These departments have supervisory powers over certain county, correctional and private institutions.

The second bill submitted by the supervisor of administration placed the tubercular sanatoria under the Department of Public Health.

At the close of last year these twenty-nine institutions cared for 24,194 individuals. The state appropriated for their maintenance and for special purposes $10,991,223, nearly one third of the total amount appropriated. For institutions under the Commission on Mental Diseases, with 16,607 patients, $6,983,853 was appropriated, 19 per cent of all moneys appropriated; 63.54 per cent of the amount appropriated for all state institutions is for the mentally sick, feebleminded and epileptic group, which numbers 68 per cent of all patients in state institutions. It is maintained that the number under care and expenditure of nearly $7,000,000 would warrant a separate department. The earliest legislation in Massachusetts was in 1676. The first insane state hospital was opened in Worcester in 1833. The Board of State Charities was organized in 1863, and the insane came under its supervision. The State Board of Health, Lunacy and Charity was created in 1879, through the recommendation of Governor Talbot. This organization was criticized and members of the board resigned, claiming that the three-headed arrangement was an injury to all of them. In 1886 the State Board of Health was made a separate department. Because of shortcomings, a commission was appointed in 1896 to investigate state institutions, and this resulted in establishing the State Board of Insanity in 1898. This board was reorganized in 1914, having three paid members in place of the unpaid board of five. The Commission on Mental Diseases was established in 1916 and the State Board of Insanity abolished.

It thus appears that the establishment of a Department of Institutions, including penal, charitable, and institutions for the mentally sick, is a return, in general, to a former method of supervision which was found impractical. A former board of insanity wisely created a financial bureau which serves a useful purpose in checking the work of institutions and making known the results to all. Each institution makes an annual estimate for maintenance which is carefully analyzed by the commission, and the results submitted to the supervisor of administration. The function of this bureau has served to meet criticism from a business point of view and yet leave initiative to the institutions. Analysis of the first bill shows that the director of this large department is appointed for three years, too short a period to formulate a definite policy. No requirements are given and one not having experience in the management of institutions might be selected. The bill would abolish boards of trustees

which have served a useful purpose here. The practical difficulty would be grouping together institutions caring for these different types with only certain phases of business administration in common. It is maintained that it would be difficult to find any person who would possess the qualifications that the director of this group of institutions should have and who would be an expert in all. Additional duties are placed upon the director, but no provision made for his relief from duties dealing with the present commission. It would appear that he would be somewhat of a figurehead and the various divisions independent. It developed at hearings that the proposed change would probably not result in economy. It is maintained that legislative bodies should move slowly in enacting changes that would result in less confidence in the institutions caring for mental cases. If it is conceded that treatment of the mentally sick is a highly specialized medical problem requiring medical experts, then supervision should be in the hands of medical men especially trained. It is absurd to argue that a medical superintendent cannot be a good administrator.

However, questions dealing with mental disease, mental defect and mental hygiene do have a bearing on the work of the other divisions. Surveys shows that 20-25 per cent of the prison population are feeble-minded, and 50 or 60 per cent abnormal mentally. There are points of contact also with the departments of health, education and public welfare. No great difficulty should be experienced in coördinating business methods and yet give to the departments separate organizations to carry on activities in their special fields. The heads could constitute a small organization for the purpose of coördinating institutional work, especially that relating to administration, and also deal with problems having to do with one or more groups. The bill as finally reported by the committee does not change the status of the Commission on Mental Diseases. [Author's abstract.]

Pollock, H. M. Comparative Statistics of State Hospitals for Mental Diseases, 1918. [Mental Hygiene, January, 1920.]

The data submitted in this review were compiled principally from reports made on standard schedules by the superintendents of the hospitals to the Bureau of Statistics of the National Committee for Mental Hygiene. Some of the data were taken from the annual reports of the institutions. It is to be regretted that, in spite of repeated efforts, no reports could be obtained from a few hospitals. Although the study is not complete, this detracts little from its value, as it is made for purposes of comparison rather than as an enumeration to secure totals.

In considering the statistics here presented, it must be remembered that the fiscal year which ended in 1918 was a year of warfare. The medical staffs and the forces of employees of the institutions were depleted as never before. Good food was scarce and expensive, and many other needed supplies could not be obtained. The energy of the

whole nation was given to the one task of winning the war. The conditions indicated by the figures, therefore, are not typical, but the data furnish a basis for a comparison of hospital conditions in war times with those in more normal years.

The statistical data submitted relative to the state hospitals are classified under the following ten headings, each of which is the subject of a separate table: (1) Patients, physicians and employees; (2) value and acreage of hospital plants; (3) Expenditures for maintenance of patients and for additions and improvements; (4) comparison of cost of maintenance of patients; (5) movement of patient population; (6) sex distribution of admissions; (7) patients discharged as recovered and improved; (8) death rates; (9) admissions in 1910 and 1918 compared; (10) Deaths in 1910 and 1918 compared. Previous to the war it was deemed necessary to have 1 physician to each 150 or 175 patients, 1 employee to each 5 or 6 patients, and 1 ward employee to each 8 or 9 patients. Only a few of the state hospitals were able to maintain this pre-war standard of care during 1918. The small number of graduate nurses employed in some of the hospitals was especially deplorable. The average of the 139 ratios of patients to physicians given is 257.3 to 1; the average of the 134 ratios of patients to employees is 7.5 to 1; and the average of the 132 ratios of patients to ward employees is 13.6 to 1. The general average ratios were 242.7 to 1, 6.9 to 1, and 12.5 to 1, respectively. A wide range of variation from the average ratios is seen in the figures of the separate institutions. The total value of all the property of hospitals from which reports were received is $197,261,782. The extraordinarily wide variations in estimated value of personal property in institutions of practically the same size are probably due in part to the lack of uniformity of view as to what constitutes personal property. The value of property per patient varies widely. The average per capita of the 127 items given is $1,192.52 and the general average per capita $1,060.03. The investments in hospital property made by the more populous states for the care of mental cases are enormous. The total of such investments as reported in 1918 in New York was $40,430,220; in Ohio, $14,486,093; in Pennsylvania, $12,499,561; in Massachusetts (exclusive of Bridgewater), $18,904,544. The figures giving acreage of the hospital plants are impressive. They show that nearly all of the institutions are generously equipped with farms and grounds which afford opportunity for expansion far beyond present limits. The total number of acres reported was 97,085, of which 48,398 were under cultivation. The average acreage of the plants of the 134 hospitals reporting is 727. The average of the 130 ratios of acres to patients is 0.70 to 1, the general average ratio being 0.51 to 1. The per capita cost in the several hospitals varies considerably, due in part to differences in cost of labor and supplies and in part to differences in standards of care. The size of the institution also has an important bearing on the per

capita cost. Other things being equal, a large institution will have a lower per capita cost than a small one. Many factors, however, must be taken into consideration. The average of the per capita costs of the 142 institutions reporting was $254.09. The general average per capita cost for all patients was $244.21. On account of the high cost of building, the scarcity of materials, and the restrictions on building necessitated by the war, the expenditures for additions and improvements to state hospitals were comparatively small in 1918, the total amount reported being $5,070,856.60. In all but five of the states a marked increase in the per capita cost of maintenance in 1918 over that of 1917 is shown. In Wyoming the increase was $70.73 per capita; in Massachusetts, $63.22; in New York, $43.54; in Connecticut, $48.20; in Oregon, $48.67; in Texas, $39.79; and in Montana, $44.33. Had pre-war standards been maintained, the per capita increase would have been much greater. In 1917 the per capita cost of maintenance in all state hospitals was $207.28. The deaths are shown by sexes, and the rates for each sex are shown per 1000 of daily average population and per 1000 of patients under treatment. The latter base is the one more generally used. The death rate in the hospitals is influenced by the sex and age distribution and by the mental and physical condition of the patients, as well as by the standard of care and maintenance. As a rule, death rates among male patients are higher than among female. This is partly accounted for by the large number of deaths among male paretic patients. Reprints of the complete study may be obtained without charge from the National Committee for Mental Hygiene, 50 Union Square, New York City. [Author's abstract.]

Goddard, H. Medicolegal Aspects of Mental Defectiveness. [Ohio State Med. Jl., September 1, 1919.]

Goddard says that we do not protect society by punishing the feebleminded. Society is never safe when these mental defectives of criminal tendencies or experience are at large. The only protection is to place them in an environment suited to their low mentality. Such an environment is furnished by an institution or colony for the feebleminded. The acitivities of the courts are largely devoted to repeaters. These repeaters are generally mentally defective. This is the logical expectation because mental defectiveness is incurable. An insane person may recover; a mental defective cannot. Once started on a criminal career, there is no reforming him. For the welfare of society and for his own happiness he must be colonized. Present laws make this a slow, difficult and costly procedure.

Lefèvre, L. Criminal Responsibility. [Arch. Méd. Belges, March, 1920, J. A. M. A.]

Lefèvre summarizes the principles which should guide the medicolegal expert, and declares that the doctrine of attenuated responsibility has no scientific justification. An act cannot be at the same time an act

of reason and of dementia. With hysteria, epilepsy and alcoholism, only those acts show lack of responsibility which bear the stamp of the disease; not those committed by hysterics, epileptics, or alcohol addicts. Constitutional diseases elsewhere than in the brain, such as tuberculosis, do not modify the anterior mental point of view, any more than a blow on the head. As the subject recovers from his comatose condition his character emerges anew, just as it does on waking every morning. Lefèvre reiterates that there is no localized point in the brain the destruction, inhibition, or irritation of which can transform an honest man into a thief or forger, or delinquent, and he adds, "Society is a body. The presence of gangrenous limbs impairs its health and may entail disease."

Funkhouser, W. L. MENTAL HYGIENE. [Jl. Med. Assoc. Georgia, January, 1920.]

Hygiene in relation to the physical man is reasonably well observed and practiced by the average doctor, also understood and followed by the laity to a considerable extent. The doctor having related mental hygiene to those studying nervous and mental diseases should balance his teaching of physical hygiene with mental hygiene. The commercial world has appreciated the fact that they cannot successfully operate without attention being paid to the mental level of their employees. The government should take stock of their mentally fit and unfit. The fit allowed to develop to the height of efficiency, increasing his kind; the unfit allowed to reach his highest approach to normal, but not permitted to lower his own mental level in his offspring. Should the mental or chronological age determine citizenship? Do we teach that inebriety, alcoholism, pauperism, criminalism, prostitution, and insanity is as much a disease as smallpox; that if a danger to the public should be under the same regulations? An individual's rights should not allow him to transmit a defective trait to future generations. The report of the commission on the feebleminded in Georgia shows, as in all other states, that in nearly all the state homes, prisons, farms, penitentiaries, reformatories, that a large percentage are feebleminded, that they and many of their ancestors have been state charges, and if not prevented their progeny will add additional expense to the taxpayer of the state. With a decrease in the nation's native stock, with birth restrictions among those best physically and mentally able to have children, with the large mass of feebleminded, and the fact that the feebleminded women have twice as many children, the state is facing a serious problem.

Georgia has made its first move, having passed an appropriation for the erection and maintenance of a home. Several mental clinics have been established in the state. The alienist, physician, educator, psychologist, psychiatrist, must coöperate to enlighten the public that, to be well, not only physical hygiene is necessary, but just as much attention must be paid to mental hygiene. [Author's abstract.]

Blair, Thos. S. Drug Addiction in the Industries. [Journal of Industrial Hygiene, October, 1919.]

The author calls in question alarmist reports concerning drug addiction among industrial workers, and presents his own nation-wide studies, the data being obtained largely from industrial surgeons, whose letters were extensively quoted. The Bureau of Drug Control of Pennsylvania finds that it is the unskilled worker who is more prone to addiction; that floating gangs of laborers number among them many addicts; that there is little addiction among transportation employees; that the outdoor laborers number among them fewer addicts than do the indoor workers, and that the professional classes have many drug users. The fault for addiction is placed upon the neglected or incompetently handled sickness problem, vicious surroundings, bad housing, commercialized medicine, ignorance, and bad economic conditions. There is need for standardization in the legitimate use of narcotic drugs, a revision of so-called medical prerogatives, more emphasis being placed on the public health side of addiction as opposed to the empiric attitude of the clinician, and the same business intervention that has brought about prohibition applied to the narcotic problem. [Author's abstract.]

Hirschfeld, Magnus. Two New Cases of Rectification of Judgments in Regard to Sex. [Neurologisches Centralblatt, February 15, 1918, No. 4, Vol. XXXVII.]

A short time ago the author had opportunity to observe a rectification of judgment in a twentieth case where the sex had been incorrectly assumed in official records. In seventeen of the preceding cases the sex was decided to be different from the one entered on the register, while only three were left unchanged, because the individuals (over forty years of age) had adjusted themselves to the sphere of the opposite sex. For specialists in neurology and psychiatry these mistakes in determining sex are of great interest because severe psychic conflicts often arise in individuals between the sexual emotion and libido, on the one hand, and the bodily sexual tendencies on the other, conflicts which may end in suicide or profound depressions. The author cites two cases of mistaken sex and discusses what the determining sex characteristics really are. He is of the opinion that the old classification of hermaphroditism of Klebs, followed by Neugebauer, is in great need of revision. For pseudo-hermaphroditism Klebs distinguished only the two classes, masculine and feminine, determined by the presence of testicles or ovaries. In reality, there is a whole series of cases where neither intra vitam nor postmorten the presence of one or the other generative gland can be proved. Virchow has repeatedly called attention to the fact that in many cases of hermaphroditism only atrophied genital glands are present, without either male or female characteristics. There is also other evidence of a neutral hermaphroditism. Examples of hermaphroditic glands

—ovotestes—are described by Reuter and Salén. For these reasons, in the author's opinion, a masculine, a feminine, and a neuter hermaphroditism should be assumed. Recently Eugen Steinach succeeded in producing other masculine and feminine characteristics in castrated animals by transplanting in them testicle or ovary substances. Steinach's conclusions concerning the etiology of hermaphroditism are quoted: "If it is possible, as I have shown, to produce both sex qualities in one and the same individual by transplanting gland cells in such a way that the subject develops the somatic and psychic characteristics of both sexes, there is good ground for the conclusion that, in numerous cases where homologous and heterologous characteristics are found in an individual apparently possessing gonads of only one sex, the gonads are only unisexual in regard to the generative quality, but in regard to the internal secretions are bisexual, containing hermaphroditic properties. There is only one cause for all hermaphroditic phenomena, and that is the existence of a hermaphroditic puberal gland (Pübertatsdrüse), as consequence of incomplete differentiation of the generative elements. The normal unisexual development is conditioned, on the other hand, by the complete differentiation of generative glands in a masculine or feminine direction." Following these discoveries, the author is of the opinion that hermaphroditism may be called a mingling of sex characteristics, and might be divided into genital, somatic, and psychic hermaphroditism (of which the most marked feature is transvertitism), and, lastly, psychosexual hermaphroditism, *i.e.*, where tendencies of the contrary sex in all their varying degrees are manifested. The author calls attention to the fact, in relation to hermaphroditism, that anomolies of internal secretion (to which hermaphroditism belongs) frequently go hand in hand with a psychopathic constitution. He does not venture to decide which of the two constitutional defects is the primary one. [J.]

Spaulding, Edith R. Three Cases of Larceny in Which the Antisocial Conduct Appeared to Represent an Effort to Compensate for Emotional Repression. [Mental Hygiene, 1920.]

In the lives of each of the three women who are described, all of whom were arrested for larceny of various kinds, there is a history of much emotional disturbance, with neither an adequate emotional outlet nor a satisfactory adjustment. Each had experienced, over periods varying from seven to sixteen years, an emotional conflict that had been revealed to no one. Associated with much repressed desire, there was in two of the cases a sense of shame, while in the third there was a disappointment in the materialization of the dreams of childhood. In all three there was a total ignorance of sex life, and a fear of knowledge regarding it, which resulted in two cases from the sense of guilt that centered about early emotional experiences. One case was considered subnormal mentally; the other two belonged to the superior group of normals. In the first case, a young woman of twenty-three, it was pos-

sible to bring to the surface, during two interviews only, an experience of the seventh year that had caused the patient to seek emotional outlet in religious ecstacy by way of compensating for a feeling of guilt and for emotional repression of a different nature. Her larceny, which consisted in cutting a bag from a woman's arm, was an isolated instance of antisocial conduct probably resulting from a temporary inability to find relief through her religion for the unnecessary sense of shame from which she had suffered since childhood. There has been no temptation to repeat the antisocial behavior in the year that has elapsed since the examination was made. The second case was that of a woman, aged twenty-five, who had stolen from shops what was estimated as $40,000 worth of goods. The immediate cause of her larceny was a conflict in her married life to which she was unable to adjust herself, largely because of lack of development in her earlier life. She obtained a feeling of satisfaction through defying the authority of the law by stealing as a compensation for unsuccessfully defying the authority of her husband, and previously her father. This patient has done well during the year that she has been free, and has found a satisfactory sublimation for her maternal longings, which have no other outlet, in literary efforts and associations. In the third case, a conscious emotional episode of the seventh year which, because of the associated repression and feelings of shame, had warped her emotional life and had resulted in petty larceny, was unearthed only after months of struggling. The patient, who was twenty-four years old, gained great relief from learning that in the emotional episode she and another had not committed an unpardonable offense, and improved very much in her general conduct and stability as a result of its being brought to light. At present she is doing exceedingly well and is much more stable than she has ever been before.

In each case, had the mental life been accessible to wise guidance at an earlier period, the antisocial behavior might easily have been prevented. While the court clinic and the institution laboratory can do much to reconstruct the reducible delinquent, the real opportunity for constructive work is in the community, where a knowledge of the principles of mental hygiene can be spread abroad through the education of the public *en masse* and through individual contact, so that mental conflicts and social maladjustments may be recognized and treated before they cause antisocial conduct and mental abnormalities. [Author's abstract.]

Lambert, A. Causes of Narcotic Habit. [Modern Med., January, 1920.]

These causes, Lambert says, must be sought for in the psychology of a personality unable or unwilling to face individual problems, difficulties, disappointments, or defeats. In such cases an anodyne is demanded to bolster up the ego or to afford escape from painful experience. Solve the personal problem and the individual is freed from the need of narcotic forgetfulness.

Stern, Erich. Psychology of Adaptation to Vocation. [Ztschr. f. d. ges. Neurol. u. Psychiat., 1920, Vol. XX. No. 2, p. 87. Referate und Ergebnisse.]

Formerly, when a decision was to be given as to whether or not an individual was fitted to a vocation, the physical condition only was taken into consideration, and the question whether he was psychically adapted was never raised. It was assumed, at least for the humbler vocations, that a normal man, if he would take the trouble, could learn any calling. The present tendency, however, is in the direction of a rational choice of vocation so that each individual may have the work for which he is mentally fitted. Since the day when the telephone companies of America consulted Münsterberg as to whether psychological tests could be used to determine the fitness of prospective employees, extensive study has been given to the subject of industrial psychology. In Germany Münsterberg's researches were continued by William Stern and Otto Lipmann, who founded a central department for vocational and industrial psychology in the Institute of Applied Psychology. But not until the exigencies of recruiting for the war brought out important facts was the importance of selecting persons adapted for particular places by psychological methods fully recognized. At this period the same methods were adopted by the railroads, street railways, etc. The Saxon state railways fitted up their own laboratories for the purpose of applying psychological tests to their personnel, as did also some large machine shops in Berlin. The psychology of individual differences reveals special tendencies which are anchored in the deepest nature of each personality, and are only slightly influenced by education or practice. For example, one individual is so constituted that his attention spreads over an extensive field with only moderate interest for any special point; another gives attention to only a circumscribed field, but within these limits there is a maximum of concentration; another can only fix his attention for a short time; still another is able to concentrate the attention unswervingly for long periods, etc. In selecting those fitted by their special mental qualities for certain vocations, it is first of all necessary to know the requirements of the vocations. The author refers to the list made by Otto Lipmann as the most complete, but also calls attention to the value of Piorgowski's classification of the vocations from a psychological point of view. He also gives the mental qualities which in his own psychological tests he found necessary for aviators and those qualities deemed requisite by other writers for such vocations as telephone operator, book seller, etc., as well as an analysis of the psychological aptitudes for some of the "higher callings." The author calls attention to the value of industrial psychology in connection with the schools as advised by Aloys Fischer and Kuckhoff, and emphasizes that this branch of applied psychology may be instrumental in stabilizing social conditions in the post-war crises by enabling those who are specially gifted to ascend to the level to which they belong. [J.]

Book Reviews

Hoch, August. Benign Stupors. A Study of a New Manic-Depressive Reaction Type. [New York, The Macmillan Company, 1921.]

This book, small in compass but important in content, forms a most valuable bequest as the author's final contribution to the advance of psychiatry. It marks a flexible attitude that has done with the rigidities of nosological classification. It recognizes the conditions here treated rather as functional psychic phenomena to be understood only by investigation from such a point of view. Careful investigation of cases forms the background for the published work, that elastic form of interpretation which is alive to the significance to the personality of a particular mode of functioning, even when this falls into the category of the "abnormal." Instead of mere helpless description of behavior in these benign stupors, with a mere academic effort to attach them to some classic grouping, there is keen observation of the active psychic ideation behind these mechanisms of apparent inaction.

There is careful recognition of the nosological relation of these stupors to malignant ones, the relative appearance of certain symptoms which may show a relation of either to the other and yet the essential difference between them. This is partly qualitative in the nature of symptoms which appear; it is also one to be quantitatively considered through discovery of the meaning to the personality of the reaction chosen in constructing the symptoms. This is interpreted in the terms which psychoanalytic investigation has made known from its study of unconscious motivation. The suggestions here offered are those to be pursued further fruitfully, as, indeed, is the whole subject of stupors from this attitude. The author has not left out of discussion a necessary description of the symptoms from the side of intellectual impairment, as well as of the manifestations otherwise considered from without. Yet the emphasis is rightfully laid upon the inner significance. Thanks are due to Dr. MacCurdy for the editorial completion of this suggestive work.

Platt, Charles. The Psychology of Thought and Feeling. A Conservative Interpretation of Results in Modern Psychology. [Dodd, Mead and Company, New York, 1921.]

This book produces a division of feeling. On the one hand, there is rejoicing that a psychology that still utilizes to some extent the more purely descriptive point of view has at the same time the broader attitude of the interrelations of psychic factors. Had there been a keener grasp of the dynamic character of the psychic life

appreciation of the work could have been more unqualified. The evidences that the author has not yet completely entered into a more unifying dynamic conception produces some statements which are misleading as psychological guides. That is, they have the danger of half truths which may be interpreted only from the angle of their falseness. Yet one feels that the writer himself has advanced with an open mind toward a more comprehensive view of psychology, and his very attitude is an inspiration in the right direction.

He limits himself in his acceptance of Freud's revelations of the psyche, yet this is due to a most common error, that of failing to appreciate the whole dynamic conception into which Freud's theories fall. So Platt still finds his acceptance of Freudianism halted by a limitation of the concept of the sexual, which he considers as only one among many instincts. He not only fails to grasp the idea of the extensive striving of life as pouring out through this great division of the instinctive life, but he leaves out the significance of the instinctive desire or need. He does not see this variously represented in the sexual as well as in its correlated instinctive group, that of the ego. So he takes only the vaguest account of the force of hindrance to such wish resulting in repression. He gives, therefore, a colorless description of the unconscious instead of one replete with most concrete wish tendencies. This it is which leads him into some superficialities of statement and permits him to fall into the serious error of talking of mental or "nervous" disturbances from an external rather than an internal point of view, dwelling in one or two instances upon the nerves rather than the force behind them. Yet so broad and sympathetic are his discussions of many problems of individual or social psychology that the book represents distinct advance.

Ranson, Stephen Walter. THE ANATOMY OF THE NERVOUS SYSTEM FROM THE STANDPOINT OF DEVELOPMENT AND FUNCTION. [With 260 Illustrations, Some of Them in Colors. W. B. Saunders Company, Philadelphia and London.]

Several things recommend this work as a peculiarly valuable one to the younger student of neurology as well as to the more experienced neurologist. Or one might say further, that it should make also a strong appeal to the worker in other fields to whom neurology must not be a closed book. For the author's presentation, both in his discussion of the subject and in the varied illustrations with which he has supplied the book, is one quickly to stimulate interest. It is simple, clear and, above all, it proceeds from a thorough appreciation of the dynamic aspect of the science of neurology. This appreciation rests upon a comprehension that neurology is only the scientific investigation and register of a genetic process begun ages ago, as the writer indicates. It proceeds by stages, each one vivid in its own structural and functional interest, also pointed out by the writer, and continues into the complexities of the human nervous system and its relation to the vast functional life of man.

The compactness of the volume, to which clearness is never sacrificed, makes it necessary that some important problems shall be hardly more than indicated. This is no defect, only a stimulus to further study in that same dynamic spirit in which this book is offered. Its external form gives it that convenience and ease of consultation which make it useful to the college student, the busy practitioner or the student in any other field.

Russell, Bertrand. THE ANALYSIS OF MIND. [George Allen and Unwin. The Macmillan Company, New York, 1921.]

A new stimulus to interest in mental problems comes to the reader from the open-minded attitude of this book. The author recedes from the hampering of accepted fixed conceptions to a position from which, as it were, he can watch phenomena in action, both mental and physical. As he looks at them in this functional aspect he is able to take his stand as neither a realist nor an idealist, metaphysically speaking. He finds that mental phenomena and physical phenomena are but manifestations of some primal life stuff which follows in either realm different laws. The duality of physics and psychology lies only in their causal relations to reality. Physics groups the particulars of reality "by their active places," that is, as these particulars proceed from objects as its effects or appearances in different places. Psychology groups them "by their passive places," that is, as these appearances or happenings are viewed from a certain spot. Psychology has its own causal laws which might be named subjectivity and mnemic causation.

Russell examines the concepts which are used in psychology and finds habit, memory and thought are all developments of mnemic causation. Consciousness is not some fundamental essence or character infusing all mental life. It is a very complex phenomena involving belief and images, but by no means an omnipresent factor in the mental life. Study of the unconscious has shown that. Consciousness is a convenient term of language to express certain relationships. The writer is never very clear, however, as to what the name shall be applied, that is, how these relationships shall be conveniently viewed under such a useful term. So he also shows some lack of clearness as to the distinction which has been made, for example, by psychoanalysis in regard to the relative conceptions, consciousness and the unconscious. In fact, his knowledge of the discoveries of psychoanalysis and its actual work upon such relationships is too incomplete for him to speak accurately about it. Nevertheless, his own examination of the various aspects of mental life, the phenomena of instinct, habit, desire, also of images and of the belief which goes with these to make up consciousness, these are all considered with clearness and from that viewpoint in which they can be seen in their functioning relationships. His discussion leads a long way in the direction of that fundamental ideal science of which he speaks, one in which "the causal laws of particulars" would be sought rather than "the causal laws of those systems of particulars

that constitute the material units of physics." Such a fundamental science would cause physics to become derivative and would not leave psychology as singular and isolated among sciences.

Kolnai, Aurel. PSYCHOANALYSE UND SOZIOLOGIE. ZUR PSYCHOLOGIE VON MASSE UND GESELLSCHAFT. [Internationaler Psychoanalytischer Verlag, Leipzig, Vienna, Zürich.]

This study of psychoanalysis in its relation to sociology presents many suggestive thoughts. While the author has stated his own ideas concisely and as clearly considered conclusions, he has left them also as points of view from which to consider many practical problems. One need not agree with his analyses of conditions in every instance, yet one is challenged to give thoughtful consideration. For situations are too easily accepted, as he suggests, with only blind rationalizations of emotional desires rather than with clear fundamental analysis of conditions.

Kolnai begins by pointing out the actual relation of psychoanalysis to sociology. As a special form of psychological research devoted to the understanding and adaptation of lives, it must itself be distinct from sociology, and yet its work is always in practical relation to the latter. It belongs with a social science which seeks truly to understand society in its psychological meaning. To such a sociology it is a distinct aid for the fuller understanding of historical social development, of the significance of present movements and conditions, and in the practical formative tasks of sociology. The writer reviews psychoanalytic interpretation, its principles and discoveries. He then turns the light of these upon the great social agitations of the present day, chiefly communism and anarchy in their relation to other phases of social condition. His analysis of these movements as particular forms of the underlying individual complexes, resistance to the father, supplanting of the father authority by the brother clan, reaching back to the mother, are suggestive thoughts for further examination in relation to these large sociological problems. It also further illuminates the understanding of the individual whose conflicts go to make up the great social struggles. [B.]

Child, Charles Manning. THE ORIGIN AND DEVELOPMENT OF THE NERVOUS SYSTEM FROM A PHYSIOLOGICAL VIEWPOINT. [The University of Chicago Press, Chicago, 1921.]

Child's presentation of the idea of the physiological axial gradient as explaining differentiation in protoplasmic growth activity is fruitful for the understanding of the development of the nervous system. He has expressed his thought clearly, leading it step by step through the report of various experimental investigations which confirm and illuminate the theory. He seeks to prove that the nervous system cannot be a peculiar structure injected at some time into a developing organism. Instead, it is only a specially developed part of such an organism following the principles of the organismic development.

The tendencies of the organism in growth are those of the simpler protoplasm. Here excitation and transmission are found to be inherent properties, which then are led on to result in differentiation of various parts of the organism for the sake of adaptation to external stimulating factors. Therefore the nervous system, following this inner law of excitation-transmission, has found its highly specialized form as a particular response to the need of the organism to adapt to environmental conditions. The central nervous system therefore becomes "the chief organ of physiological integration, because it represents the working out in ontogeny and phylogeny of the primary organismic integrating factors, the excitation-transmission relations." The physiological gradients are not in any way cause of development; they merely represent an explanation of the framework through which hereditary tendencies may be passed on as potentialities and brought to fulfilment. They represent the manner in which differentiated organismic development takes place. A specially interesting chapter on neuron development offers a criticism and modification of Kappers's theory of "Neurobiotaxis." Child's more detailed explanation of the electrical phenomena at work in the growth of the neuron carries the explanation in a slightly different direction than Kappers has done, and avoids what he considers certain difficulties which seem not to accord with "fact."

The author brings forward his theories with no finality, only as a carefully considered attempt to explain anatomical differentiation, chiefly that of the central nervous system, from this viewpoint of a physiologically continuous process. He only suggests the importance that this has for psychology. He keeps the way clear from any obscure theorizing about heredity; he avoids the inexplicable suggestions of metaphysics. In other words, he opens up a fertile field where thought and investigation may proceed with a clear path. [J.]

LOUIS-ANTOINE RANVIER

The death of Ranvier on March 22, 1922, at the age of 87 years, comes almost to remind the world that he was still alive. The work which he had accomplished, fundamental in character and progressive in its relation to continually arising problems, has imprinted his name indelibly upon the history of medicine and of neurology. Personally, however, he had chosen an obscure retirement twenty years ago, withdrawing himself to the spot of his choice in the mountains, where he lived and died, in the village of Thélys.

He was born at Lyons in 1835, and after receiving his degree of medicine in 1865 became assistant in medicine in the Collège de France, where he worked with Claude Bernard. Later he served as assistant director of the histological laboratory and then as director, becoming also professor of anatomy in the same college. He was a member of the Academy of Medicine and of the Academy of Sciences.

He was a close disciple of Magendie and Claude Bernard, but early showed his own great interest in the minute study of structure. He was not only the founder of histopathology, making the discovery of many histological facts, the result of his close investigations and his development of the use of the microscope. His interest could not stop there. It was concerned chiefly in the meaning of these discoveries and the use of the microscope to understand those physiological questions which present themselves for practical consideration. Many morphological facts may be accredited as his discoveries. He followed out the nerve terminations in the muscles, skin, cornea, described the nodes which go by his name, and the medullary nerve sheaths, the fibers of the spinal ganglia, the filaments of the Malphigian cells. But he also studied the inflammatory reaction of the endothelial cells, the cicatrization of the lesions of the cornea, the modification of the glandular cells after excitation of the nerves. He studied regeneration of the sectioned nerves through the budding of the axis cylinders, investigated the nerves of the heart, studied the muscles and the lymphatics. In short, his histological results meant nothing to him unless they were carried further to explain physiological facts, pathological or otherwise.

His published works manifest this practical application of the mere facts discovered. With Cornil he published a "Manuel d'histologie pathologique." He also produced various volumes of his anatomical researches and lectures at the Collège de France. These related to the muscular system, the histology of the nervous system, the terminal nervous apparatus of the living organism, etc. He also published a "Traité technique d'histologie."

SMITH ELY JELLIFFE.

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The Journal

OF

Nervous and Mental Disease

An American Journal of Neurology and Psychiatry, Founded in 1874

ORIGINAL ARTICLES

THE DIAGNOSTIC VALUE OF VEGETATIVE DISTURBANCES IN DISEASES OF THE NERVOUS SYSTEM.*

By E. A. Spiegel, M.D.,

ASSISTANT OF THE VIENNA NEUROLOGICAL INSTITUTE.[1]

The demand of the practising physician for as exact a localization of observed symptoms as possible opens up ever new tasks for theoretical neurology. The ambiguity of the symptoms causes one to seek new signs which correspond to lesions of the different parts of the central nervous system. Therefore we have to learn not only to observe and to explain the disturbances of voluntary motor activity and of conscious sensation but also to draw within the circle of our diagnostic considerations symptoms occurring in those parts of the nervous system which are only in a looser dependency upon the central nervous system having preserved a certain independence, that is the vegetative nervous system.

The reason why it is rarely possible, even when they are submitted to observation, to determine functional disturbances in the sphere of the vegetative nervous system in central diseases is to be sought in the general structure of the former. It is not only, as Langley has shown, that a ganglion is regularly interpolated between the cerebrospinal portion of the central nervous system and the peripheral organ, the central portion of the vegetative path also apparently consists mostly of several neurons interpolated one above the other. Thus the failure of the nervous control which proceeds from

[* Authorized translation, freely re-edited, "Jahreskurse für ärztliche Fortbildung (May, 1921). Lehmann, München.]

[1] From the Neurological Institute of the University of Vienna. Director Prof. O. Marburg.

a certain part of the central organ may easily be rendered null by a compensatory functioning of deeper parts. Still much more than in the somatic sphere signs of disturbance of function of a center will be distinguished from signs of stimulation by their transitory character. They will be the more unsteady the more cerebral the lesion is because then so much the more intermediate stations with possibility of compensatory substitution are interpolated between the place of injury and the peripheral organ.

From this it follows that lesions of the spinal cord especially may lead to more or less permanent functional disturbances in the autonomic system and that therefore these changes merit consideration in the segmental diagnosis of the spinal cord. This proves correct most of all for that part of the medulla spinalis in which the centers of other somatic functions are almost entirely supplanted by centers

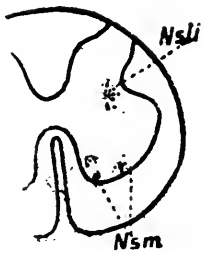

Fig. 1. Sacral Cord. Nsli, Lateral inferior sympathetic synapse; Nsm, Median sympathetic synapse.

of smooth musculature, that is for the conus terminalis. Down from the third sacral segment the characteristic multipolar cells of the anterior horn which we know as centers of the striated musculature are more and more replaced by peculiar, much smaller bludgeon- or spindle-like thickly arranged cells, that type which Jacobsohn has described as characteristic for sympathetic elements of the spinal cord. We may consider the nuclei formed by these cells, that is to say the N. sympathicus lateralis inferior situated in the angle between the anterior and the posterior horn, the group described by Onuf on the periphery of the anterior horn in the third sacral segment, finally the collections of cells to be met on the medial periphery of the anterior horn, N. sympathicus medialis lumbosacralis of Jacobsohn. In how far these groups are coördinated with certain organs of the pelvis it is impossible to say either from the comparative anatomical investigations in man and woman at different ages (Bräutigam, Sakai) or from the cases analyzed up to the present time (de

Buck, Bruce, Irimesca, and Parhon). For in none of these cases was a hollow organ of the pelvis affected alone, but always at the same time other organs or the striped musculature, too, so that there were always in the spinal cord several groups of cells in axonal degeneration. But furthermore it is not to be expected that definite groups of cells are coördinated with definite organs, because we know from researches concerning the distribution of the innervation of the voluntary musculature in the spinal cord that always several groups of cells are involved in the innervation of one muscle, respectively of one group of muscles. Thus it comes to pass that the centers in the spinal cord for the pelvic organs extend themselves vertically also along the cord. Therefore the statement that a certain hollow organ is represented by a certain segment is to be understood only in that way, that this segment chiefly but not exclusively sends different fibers to the organ concerned.

Thus L. R. Müller, on the basis of the cases set down in literature (I. Kirchhoff, Kocher, Oppenheim, Sarbó, Schlesinger, etc.) and of his own observations originally placed the center for the bladder in the fourth, the center of the M. sphincter ani externus in the fifth sacral segment, but has recently taken his stand against the fixed acceptance of a certain single segment. He only states that the pelvic nerves which effect the discharge of urine descend from the lower sacral segments, the hypogastric nerves which inhibit it from the upper lumbar segments. The question of the stricter segmental innervation of the bladder loses its importance to the clinical physician because, as L. R. Müller emphasized at first and the experiences of the late war confirmed (Marburg and Ranzi, Schwarz), in diseases of the conus terminalis or of the cauda equina disturbances of the bladder may arise quite similar to those in transverse lesions in higher segments. Initially there may occur, as the observations of the last mentioned authors showed in the wounded in the clinic of Eiselsberg, incontinence with dripping of urine and ability of the bladder to discharge its contents as well as retention also, an inability to relax the M. sphincter vesicae. Further the picture of the automatic bladder described first by Müller develops itself, that state in which the urine is automatically forced out at certain intervals. The fact, experimentally proved by Zeissl, Langley, Anderson and others, that the Nn. erigentes coming from the sacral segments, effect the emission of urine, the Nn. hypogastrici located in the lumbar segments inhibit this function; this fact of antagonistic influence of lumbar and sacral centers has not yet found clinical semeiological expression. In order to distinguish between

a disturbance concerning the conus and a higher transverse lesion the fact might be taken into consideration that a destruction of sacral centers but not a transverse lesion above the conus must lead to a loss of the reflex control of the bladder which passes over the spinal cord. Thus L. R. Müller observed that in a transverse lesion in the dorsal region an irritation of the skin of the lower extremities effected an emission of urine, a reflex which was wanting in an injury of the sacral region.

In the same way in disturbances of the innervation of the rectum a lesion of the centers situated in the conus, S_5, may be best distinguished from a lesion of the central path by the fact that only in the first case is the reflex arc passing over the spinal cord interrupted so that the contraction of the sphincters, among which the striped M. sphincter ani externus is certainly to be taken into consideration, fails on touching the mucous membrane of the anus.

Concerning the internal genitals we are informed in regard to the uterus and vagina only by means of animal experimentation (Budge, Körner, Sherrington, Langley-Anderson). The act of birth in human beings apparently can take place even if the sacral centers are destroyed, as an observation of Higier proves (Deutsche Zeitschr. f. Nervenheilk. IX.) Concerning the masculine genital L. R. Müller originally took S_2 as center of erection, S_3 as center of ejaculation, while he assumes in a more recent work, together with Dahl, that the ejaculation reflex passes over the upper lumbar segments, that of erection over S_3. But his present description is also so far contradictory to his former one, as he originally held it probable [D. Z. f. N. 19, p. 328] that the reflex giving rise to erection and the first part of ejaculation is released only in the sympathetic nervous system. Recently on the basis of observations upon dogs, in which, after the removal of the lower sacral region, erection upon friction of the penis ceased, he denies a reflex arc existing outside the spinal cord. In contradiction to this we must refer to the fact that according to the experience in man the existence of a peripheral reflex arc complete outside of the spinal cord is to be maintained. For Marburg and Ranzi were able to observe in the wounded at the Eiselsberg clinic, also in complete destruction of the cauda equina, histologically controlled, erections that, as Prof. Marburg told me personally, were not caused psychically but could be caused by merely mechanical irritation of the penis.

This fact, that erections do not pass merely over a spinal but also over a peripheral autonomic reflex arc is important for estimating

the symptom of the " disassociated disturbance of potency " described by H. Curschmann and Boenheim.

Ejaculation in its end phase, the emission of the semen from the pars prostatica urethrae, is known to be caused by the contraction of the striped M. bulbo- and ischiocavernosus. Therefore the normal innervation of this process is bound with the intact condition of the reflex arc passing over the spinal cord. Proceeding from the supposition that the ejaculation center lies in S_3 under the erection center situated in S_2, Boenheim considers the absence or the diminution of the ejaculation while capacity for erection remains as characteristic for a localized affection in the conus terminalis, as far as this affection lies in the spinal cord. Since, further, the orgasm is caused by the sensation of the muscle contractions which take place

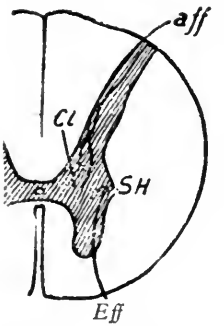

Fig. 2. Dorsal Cord. Aff, afferent; eff, efferent vegetative fibers; Cl, Clarke's columns; SH, Lateral horn.

at ejaculation, a lesion in the conus, which in case of lesion of the ejaculation center interrupts also the centripetal fibers from the genitals, must lead to a reduction or a suspension of the orgasm when libido is present. The author means that this symptom picture of the dissociated disturbance of potency, that is, disturbance of ejaculation when erection is maintained and failure of the orgasm when libido is retained, must be valuable for the differential diagnosis of conus affections. The fact mentioned above that the erection may be caused also through the reflex arc outside the spinal cord, as Boenheim himself admits, must limit considerably the value of this phenomenon. Therefore it is possible that as this symptom appears in an affection of S_3 alone, so also it may appear in simultaneous affection of the erection center. Besides, it may appear just as well in conus as in caudal lesion since erection may take place

also when all the sacral roots are affected. Certainly we have to agree with Boenheim that in disease involving the erection center or its roots in the beginning there will be disturbances of the erection which will be equalized only gradually by the peripheral reflex, so that in any case a dissociated disturbance of potency existing from the beginning without a preceding disturbance of erection may be considered as a symptom of lesion of the conus.

It is also important for the segmental diagnosis in the conus that the feeling of fulness of the bladder and of the rectum may be still preserved at a lesion of the myelin substance in the lowest part of the conus (Kocher) while the motor centers of these organs do not function any more. Thus the sensory fibers of these organs enter the spinal cord at a higher level than that of the emergence of the motor fibers and therefore the conservation of the sensitivity of the bladder and of the rectum in existing paralysis of these organs speaks for the fact that the process which has destroyed the motor centers did not penetrate the myelin sheath of the higher segments.

The disorders of the vegetative nervous system have much less significance for the segmental diagnosis of the other divisions of the spinal cord than for the symptomatology of the conus terminalis. From numerous investigations in degeneration (Biedl, Onuf and Collins, Laignel-Lavastine, Huet, Anderson, Scaffidi, on the other side Lapinsky and Cassirer) we know that above all a certain group of cells of the gray substance, namely, the cells of the lateral horn, which are distinctly characterized by their *smallness, their coarse form*, their thick stratification, their position in a gelatin-like substance (N. sympathicus lateralis superior of Jacobsohn) are to be considered as centers of efferent, autonomic fibers that perhaps in addition to this afferent fibers are ending about the cells of Clarke's column, just as small ones do about the groups of cells attached to the central canal (paramedial cells), also the substantia gelatinosa Rolando stands perhaps in connection with the fibers of the autonomic system (T. Sano). Concerning the closer functional importance of these groups of cells it is established only for the centrum ciliospinale, which sends off the sympathetic tract to the smooth musculature of the eye into the cervical sympathicus of the same side, that it is represented by the cells of the lateral horn in the transition between the cervical and the dorsal segments (Jacobsohn). The same or the neighboring groups of cells arranged round the central canal in the dorsal segments apparently control the innervation of the sweat glands and of the blood vessels. This may be supposed in consequence of the observations upon the diturbances of these

functions in lesions of the gray substance (Higier) but we are not able to attribute these functions to definite groups of cells. The central paths for the segmental centers of the spinal cord probably pass along the lateral column chiefly of the same side, although so far we have not succeeded in delimiting them as isolated systems. We only know that disturbance of the innervation of the sweat glands and the vasomotors can arise on the same side when there are unilateral lesions of the spinal cord.

Concerning the clinical value of the lesions of the spinal centers and of the paths for the innervation of the sweat glands and the blood vessels the researches of Schlesinger show that perhaps the peripheral extension of the nerves which control perspiration combines with that of the sensory nerves. The expectation was not fulfilled which we based upon the fact that in transverse lesions of the spinal cord disturbances of the sweat secretion might give us, in place of or in completion of a test for sensibility, an objective suggestion easy to be established for the segmental diagnosis of the injury. This was first due to the fact that the distribution of the sweat nerves is not always found in the manner described by Schlesinger in the territory of distribution of the sensory nerves. It was chiefly because, in spite of the numerous observations of transverse lesions which the recent years of the war have furnished us, no regularity could be established as to when with a transverse lesion hyperhidrosis and when anhidrosis appeared in the area affected. It deserves to be stated in any case that with unilateral lesions of the spinal cord anhidrosis may follow in the paralyzed half of the body, an anhidrosis which is not removed even by an injection of pilocarpin (Bickeles and Gerstmann, Karplus; not discovered by Marburg and Ranzi in their cases) as I could convince myself by experiments upon cats. Thus at an interruption of the fibers going from the higher portions of the brain to the spinal centers of the sweat secretion there can be removal of the irritability of the peripheral organs to the pilocarpin which attacks the nerve endings. This is a fact which leads us to believe that the central paths of the autonomic nervous system do not only conduct excitations and inhibitions to the periphery, but also influence the sensibility, the irritability of the peripheral organs.

For the segmental diagnosis of the spinal cord disturbances of the innervation of the vasomotors seem to be of greater importance than the disorders of secretion. Disturbances of the reflex irritability of the vascular system were for example established by Stursberg at interruptions of conduction of the spinal cord. But the

plethysmographic method applied by this author is better fitted for scientific than for practical purposes. For the latter the study of dermographia is more worthy of consideration. L. H. Müller distinguishes between a local dermographia limited to the spot of the irritation which must be caused by a direct irritation of the capillary vessels of the skin and a reflex dermographia which is characterized by hyperemic and anemic spots on a wider field and which must depend upon a reflex passing over the spinal cord. In transverse myelitis of the dorsal cord Müller finds an absence of this reflex dermographia answering to the skin area which is supplied by the affected segment. In cases in which, generally speaking, a distinct reflex dermographia can be produced its absence in the segment may be therefore useful for the segmental diagnosis in the spinal cord.

Our conceptions of the mechanism of trophic disturbances are still very unclear and they are in any case clinically observed in diseases of the central nervous system only within the region of sensory or vasomotor disturbances. Therefore they have diagnostically no independent position, and I abstain from a more detailed discussion of their significance.

The disturbances in the sympathetic innervation of the eye, sympathetic ophthalmoplegia, may betray themselves as well in the triad of Horner's syndrome, miosis, ptosis, enophthalmia, as also by a single one of these symptoms, a fact which tells us that the tracts coming from the cortex, that is subcortical ganglia, that go to the ciliospinal center, to the cells of the lateral horn at the height of C_8 and D_1 contain their own separate fibers for the innervation of the pupil, of the eyelid and of Müller's muscle in the orbits. These fibers partly have a common field in the lateral column, partly pass in isolation the one from the other. The thing becomes still more complicated by the fact that near the pupillo-dilatory fibers there seem to be also tracts inhibiting the dilation of the pupil. For Shima was able to observe that at lesions of the central sympathetic paths of the eye the sensitiveness of the pupil for local adrenalin action is raised so that on the side of the lesion one may obtain, by an instillation of adrenalin into the eye, a mydriasis normally not producible. From this we see that as in the sweat glands the central autonomic paths may influence also the sensitiveness of the peripheral nerve endings. Thus an altered irritability of autonomic organs to the pharmacology of the vegetative nervous system may be observed also in a central affection.

Among the cranial nerves arising from the rhombencephalon we are interested particularly in the vagus nerve, the disturbances of

which show themselves to the physician above all in the alteration of the heart rate. But we have to confess that we are still insufficiently informed concerning the center of the fibers inhibiting the heart. We know indeed that the nucleus dorsalis vagi which lies directly under the floor of the ventricle has to be taken for the center of the efferent fibers to the intestines (Gaskell, Bruce, Marinesco, Kohnstamm and Wolfstein, etc.), and in regard to the localization in this nucleus we are able to state that the smooth musculature of the intestinal tract is represented above all in its posterior part (Kosaka and Yagita, Vermeulen) the plexus pulmonalis in its anterior portion (Hudovernig).

It is just in respect to the localization of the heart vagus that opinions still diverge. Some of the authors consider the nucleus

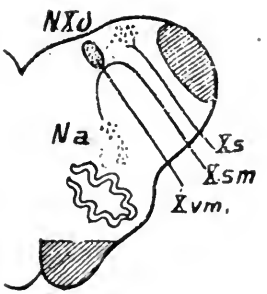

Fig. 3. Medulla. Xs, Sensory vagus; Xsm, Somatic motor; Xvm, Visceromotor vagus fibers; NXd, Dorsal vagus nucleus; Na, Nucleus ambiguus.

dorsalis X as the center of the inhibiting fibers of the heart (Kohnstamm, L. R. Müller, Molhant), more recent researches on the contrary lead to the admission that this nucleus is to be sought in the depth of the medulla oblongata in the sphere of the nucleus ambiguus (Kosaka and Yagita, Sturmann). The pathological anatomical results of the present time are also not uniform. Kato Toyoiro found changes in the nucelus dorsalis X in increase of brain pressure by tumors but at the same time also in the nucleus ambiguus and in the emerging roots of the X cranial nerve. I myself failed to find in cases of meningitis changes transgressing the normal limit in the nuclei of the vagus, and what is more, I found the inflammation of the meninges spreading over to the emerging roots of the nerve so that we have to confess that to-day we are still uninformed surely about the origin of the heart inhibiting fibers.

Yet there are cases known in the literature (Lemcke, Reinhold) where with slight lesions in the sphere of the nucleus dorsalis vagi a serious bradycardia, further, disturbances of the respiration, as a result the Adam-Stokes and Cheyne-Stokes symptom complex occurred, so that we are warranted by the appearance of these symptoms to suppose an involvement of the gray substance of the ventricle in existing bulbar disease. But it seems unjustified to refer these disturbances, in particular Cheyne-Stokes respiration, to the dorsal vagus-nucleus. For in the present state of knowledge that nucleus, as far as it concerns the lungs, is to be considered only as the center of the efferent fibers for the smooth musculature of the trachea and of the bronchi. Nevertheless if affections in the central gray substance around the fourth ventricle lead to serious troubles in respiration I suppose we have to refer these disturbances rather to a deficiency in regulation of respiration depending upon the afferent vagus fibers.

The sensory fibers of the vagus nerve, that is, those fibers which provide for the "self regulation of respiration" (Breuer-Hering) end in small cells laterally from the nucleus dorsalis vagi. Lesions of the gray substance of the ventricle may destroy the ends of these fibers themselves or may injure the tracts going out from the sensory and nuclei of the vagus which are the intermediaries for the reflex influence of the segmental centers of the respiratory musculature. They may lead therefore to disturbances of respiration without a mystical respiration center to bear the responsibility.

The prognostic value of these disturbances of respiration is quite obvious. The attempt has been made, therefore, to locate the "vital knot" of the physiologist in this region. Therefore it is not unimportant for the physician in affections of the medulla oblongata to make sure whether the affection approaches the feared "center of respiration" or not. In particular apoplectiform bulbar paralysis from hemorrhage in the lateral field of the medulla oblongata in the sphere of the arteria cerebelli inferior posterior is to be taken into consideration. General vasomotor disturbances, reduction of blood pressure may not serve to answer this question as the assumption of a general vasomotor center on the floor of the fourth ventricle (Reinhold) could not withstand the penetrating criticism of Cassirer and on the whole the existence of a general vasomotor center in the medulla oblongata is still under discussion. A glycosuria, excluding other causes, points rather to the fact that perhaps the sphere of the nucleus dorsalis vagi is affected. The clinical observations in regard to that question are ambiguous (of Marburg).

But Brugsch, Dresel, Lewy stated that by a destruction of the nucleus dorsalis on one side, hyperglycemia and glycosuria can be produced, and they designate the nucleus dorsalis vagi directly as a glycogen center. Above all it must be remembered that Marburg and Breuer have made it apparent that the sympathetic tract for the eye passes through the dorsal sphere of the substantia reticularis so that the formerly mentioned sympathetic ophthalmoplegia leads us to suppose that a lesion approaches the floor of the ventricle. We know just as little, it is true, concerning the more exact course of the sympathetic paths of the medulla oblongata as we do of those of the spinal cord. We only know that in disturbances that concern the substantia reticularis symptoms may occur on the part of the blood vessels, of the sweat glands and of the smooth musculature of the eye, that the symptoms of the eye appear homolaterally while the sudoral and vasomotor disturbances of the blood vessels are observed contralaterally in the extremities in lesions which are cerebral from the pyramidal decussation, and in the face homolaterally. For the vegetative fibers for the head cross directly behind the thalamus (cf. Marburg and Breuer) for the extremities at the height of the pyramidal crossing (Schlesinger, Karplus) or somewhat cerebral from it (Depisch). The independence of the vegetative fibers from the voluntary paths is at all events proved by the fact that unilateral symptoms of the vasomotors, symptoms of irritation or paralyses, may occur at affections in the bulbus independently of disturbances of voluntary motility, a symptom that with Babinski we may term thermo-asymmetry and vaso-asymmetry.

For the localization in the region of the pons in the field of the vegetative nervous system, symptoms of the salivary glands are chiefly to be taken into consideration, the center of which is to be sought in scattered cells of the substantia reticularis. In particular cells of the formatio reticularis at the level of the seventh nucleus N. salivatorius superior of Kohnstamm, also of Yagita and Hayama, are considered as centers of the submaxillary gland, while cells between the inferior olive and the nucleus ambiguus (N. salivatorius inferior) (Kohnstamm) or groups of cells lying in the direct caudal continuation of the submaxillary center (Yagita and Hayama) are considered as the center of the parotid gland. Clinical observations (J. Fischl, Spiller) and recently also a more exact anatomically investigated case of Feiling show that apparently conditions are similar in man. In considering the anomalies of the salivary secretion in pontine, respectively bulbar affectons, it is certainly necessary to exclude first the idea that an existing salivation is only

a consequence of a paralysis of the mouth musculature existing at the same time before considering it as a sign of a lesion of the cells of origin or of the emerging fibers of the nerves of the gland.

Our knowledge concerning the influence of the cerebellum on the vegetative nervous system is too little assured to be diagnostically of value.

As regards the midbrain, we are interested above all in the question how far disturbances of the pupillary reflex are applicable for local diagnosis. Karplus and Kreidl have shown by experiments upon monkeys that the afferent fibers of the reflex arc pass over the branchia of the anterior corpora quadrigemina since section through the branchia leads to an isolated loss of the pupillary reflex to light. But we have no more exact knowledge of the further course of the

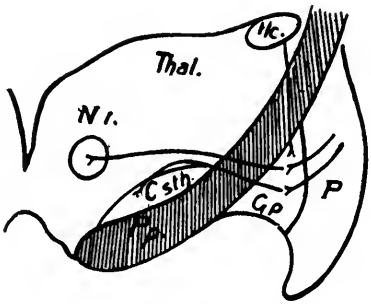

Fig. 4. Thal, Thalamus; Csth, Corpus subthalamicus; Pp, Pes pedunculi; Cl, Internal capsule; Gp, Globus pallidus; P, Putamen.

reflex arc. Above all, we do not yet know with certainty where we must seek the center of the smooth musculature of the eye. The opinion of Majano that the innervating fibers of the M. sphincter pupillae start from the gray substance of the corpora quadrigemina anteriora did not prove correct. It is nevertheless uncertain whether these fibers originate in the small group of cells which we may isolate dorsally from this nucleus on both sides of the middle line and which is described as the nucleus of Edinger and Westphal or whether they have their origin together with the fibers leading to the striped muscles of the eye on the large celled portions of the nucleus oculomotorius. Clinical and pathological-anatomical experiments are as little uniform as the results of animal experimentation, and in many ways the researches of comparative anatomy lead to contradictory results (cf. Brouwer, Spiegel).

Therefore it seemed to be useful to submit the comparative anatomy of the region of this nucleus once more to revision starting from the point of view that the fairly constant pupil reaction in the vertebrate series must be represented by a fairly constant nucleus, that on the other hand the much more variable capacity for accommodation on the part of the lens must presuppose that the center for the M. ciliaris has varied much more in its development. Indeed, researches made by Dr. Zweig at my instigation seem to point to the fact that the nucelus of Edinger and Westphal has developed very variably in various series of animals, reaching its clearest differentiation in man, while on the contrary a group separable in its most anterior portions from the Edinger-Westphal nucleus, the so-called nucleus medialis anterior could be found in all animals examined. In animals with a poorer development of this nucleus medialis anterior there could be found small cells intermingled with the large cells of the chief nucleus in the anterior pole of the nucleus oculomotorius. Therefore it seems possible that the center of the fibers of the pupil is to be sought at least partly in the nucleus med. ant. but it is not impossible that also the anterior portions of the large celled chief nucleus of the oculomotorius participate in the innervation of the pupil. It is in accord with this that we must assume the pupillary fibers to have their course in the most anterior portions of the oculomotorius bundle as it passes out, which we learn from the investigations in stimulation of Hensen and Völker, Bernheimer and from the researches of Kahler and Pick. Oyon's case also testifies to this (cf. also Marburg). Thus in any case we can go so far to-day as to say that for the local diagnosis in the midbrain loss of pupillary reflex in a process of the midbrain when other causes are excluded points to the fact that the most anterior portions of the midbrain are affected on their passage to the thalamus opticus.

Concerning the midbrain the attention was directed above all to the hypothalamic region by experiments of Karplus and Kreidl. Both authors showed in different animals that an irritation on the base of the midbrain behind the tractus opticus lateral from the infundibulum causes dilation of the pupil on both sides, an enlargement of the palpebral, a withdrawal of the third lid, an effect that persisted also after degeneration of the tract descending from the cortex, after section through the adjacent cranial nerves as after severance of all connections with the spot of irritation with the exception of that of the pedunculus. An irritation of the caudal half of a frontal section through the thalamus showed that this

effect had been produced by irritation of the corpus subthalamicum. Secretion of perspiration and of tears as well as a contraction of the blood vessels could be proved on irritation of this center together with the symptoms of the eye already described. The corpus subthalamicum also seems to effect at least partly the sympathetic reflex of the eyes following pain stimulus, as after section through the brain caudal from the hypothalamus as a result of stimulus of the nervus ischiadicus dilation of the pupil was absent.

Clinical observations of symptoms of the center of Karplus-Kreidl are very rare. Gerstmann found with a gunshot wound of the right temple a left-sided increase of the tendon reflex, Babinski's sign, hypoesthesia and hyperalgesia combined with Horner's syndrome of the right side, which he referred to a lesion of the right corpus subthalamicum. Schrottenbach's case showed a left-sided motor and sensory paralysis, hemianopsia and conjugated paralysis of sight toward the same side, disturbance of secretion in the face and in the left eye, mimic palsy of the left half of the face, symptoms that we were able to explain by a lesion of the region of the right thalamus opticus, of the adjacent hemispheres and of the pyramidal tracts. Absence of the sympathetic pupillary reflex on pain could also be established similarly as in the experiments of Karplus and Kreidl, so that we may think of participation on the part of the subthalamic center of the sympathicus. But as long as there are no cases investigated anatomically the diagnosis of a lesion in the center of Karplux-Kreidl will be only a supposition. For the diagnosis may be based only on the combination of symptoms of the thalamus and the neighboring capsula interna with disturbance of the innervation of the smooth musculature of the eye, of the sweat glands and of the blood vessels. These symptoms of failure of the autonomic system may be caused as well by injury to the cortical fibers which go down into the inner capsule to the center of Karplus-Kreidl as by a lesion of the corpus subthalamicum. We know that with a hemiplegia vasomotor disturbances (Oppenheim, Parhon and Goldstein, Ingelrans) may occur as well as anomalies of the sweat secretion (cf. Pandi, Cassirer), sympathetic ophthalmoplegia (Seeligmüller, Prévost, Nothnagel, Klippel and Weil) symptoms that appear at affections cerebral from the thalamus contralaterally from the lesion (cf. Marburg and Breuer). Even if it can be shown that an affection to be assumed in the region of the thalamus opticus annihilates the reflex dilation of the pupil on pain stimulus we can not yet state with certainty that interruption of the reflex follows in the corpus subthalamicum itself. It could

be that the fibers leading to that center or radiating from it may be injured as well.

We have to be very cautious as yet also in referring bladder disturbances to thalamus lesions. The researches of Lichtenstern make it probable that the bladder contractions observed already by the older authors (Nussbaum, Bechterew and Mislawsky, Ott and Wood, Field) at irritation of the thalamus stand likewise in connection with a hypothalamic sympathetic center. But there were no clear cases observed where we would have had the right to refer with certainty the clinically observed bladder disturbances to the thalamus opticus for we were not able to exclude a participation of the pedunculus in any of the cases so far observed. (Clarke, Fleischmann, Eisenlohr, Marburg and Czyhlarz.) The last mentioned authors consider the question whether the relation of the thalamus to the psychic reflex does not represent the intermediate member for the participation of this part of the brain in the innervation of the bladder since there is often in affective situations an involuntary discharge of urine. But they themselves doubt an important connection of the thalamus with the innervation of the bladder.

There is more material on the other hand as to the connection of the midbrain with the secretion of the kidney. Originally diabetes insipidus at lesion at the base of the skull was connected with the hypophysis, at first hyperfunction, later a hypofunction of the posterior lobe of this gland has been assumed (Frank, Goldzeiher, Simmonds). But there occurred cases where a disappearance of polyuria was observed with enlargement of a tumor at the base of the skull. On the other hand even the total destruction of this gland occurred without polyuria. Therefore they thought that the activity of the preserved anterior lobe which seems to produce diuretic substances (Cushing) is necessary for the origin of the polyuria (Fleckseder, Hann). But it was necessary to extend this explanation also as diabetes insipidus was observed with a hypophysis histologically intact. Fleckseder had already thought of a participation of the infundibulum and was able to show that indeed it did share in the changes in a series of cases. Recently Leschke especially has gone further trying to prove that destruction or atrophy of the entire hypophysis or of one of its lobes can not lead to diabetes insipidus. An isolated lesion of the posterior lobe, according to him, proceeds without any symptoms in animals and in man, while a destruction of the anterior lobe leads to hypophyseal cachexia. On the other hand polyuria arises after puncture of the

base of the midbrain closely behind the infundibulum so that he is inclined to refer diabetes insipidus to functional disturbances of the midbrain. It seems questionable if we are permitted to go so far yet at the present time in the denial of the hypophyseal genesis of diabetes insipidus. For in a part of the cases of the literature collected by Leschske secretory disturbances of the kidney are not noted. In most of them histological research of the hypophysis is lacking but a disturbance of the function of this gland may not be excluded summarily even when it is completely intact. Since the gland is innervated from the infundibulum therefore lesion of this region leads probably to the symptoms of diabetes insipidus merely by a disturbance of the innervation of the hypophysis. Therefore to-day we are merely able to say that the appearance of diabetes insipidus at a lesion supposed to be at the base of the skull is certainly of great importance as giving support to this diagnosis but that it is impossible to establish a more exact local diagnosis, whether this lesion concerns the hypophysis or the infundibulum, by the symptom of diabetes insipidus alone.

We touch a theme that is still completely under discussion if we apply ourselves to the question if a lesion of the ganglia of the forebrain may be the seat of disturbance in the sphere of the autonomic system or not. The great constancy of the striatum (= nucleus caudatus + putamen) in the mammalian series, its independence of the development of the cortex cf. Spiegel has led to the supposition that we have to do here with a ganglion which preeminently controls only the more autonomic innervation (cf. Spiegel). In support of this view we mention that the globus pallidus where the fibers end that arise in the nucleus caudatus and the putamen is in relation with the corpus hypothalamicum, thus with the sympathetic center of Karplus-Kreidl.

It is necessary to mention above all hyperthermia from brain puncture to answer the question whether disturbances in the vegetative nervous system are found as signs of a striatum complex. This hyperthermia has been observed in experiments upon animals (Aronsohn and Sachs, Richet, Baginski and Lehmann, Girard, H. White, Ito, Sawadowski, Schüller) as well as in man in injury of the nucleus caudatus (e. g., case of Hirsch). The experiments of Hirsch, Müller and Rolly have shown that this hyperthermia is caused above all by a change in the innervation of the great glands of digestion, which contrary to older statements proved that the thermal puncture is successful also in the animal completely curarized, while ineffectual in a rabbit, deprived of all its glycogen. On

the other hand it has become more and more doubtful if this hyperthermia is to be considered a special symptom of the nucleus caudatus as in the experiments mentioned regularly opening of the lateral ventricle took place. Irritation of the ventricle in and by itself leads to hyperthermia as an observation of Müller and Glaser has recently shown. Further, it is necessary to mention the fact that it is not alone the striatum that regulates the temperature but that according to researches of Isenschmid and Krehl a suspension of the regulation of temperature was observed only if the forebrain and the midbrain were separated from their spinal connections, but not if the forebrain alone had been separated. Further, Isenschmid and Schnitzler verified a suspension of the regulation of temperature chiefly after removal of the tuber cinereum. It would be premature to conclude from this that the corpus striatum has nothing to do with the regulation of temperature. Fiber connections have been found between the nucleus lentiformis and the tuber cinerum (Monakow, Dejerine, Grünstein), so that on the ground of more recent experimental results we may assume that the ganglia of the forebrain are interpolated too in the mechanism for regulating temperature. Only we have to limit the diagnosis value of the centrally conditioned hypothermia for this reason. This speaks itself for a process in the ganglia arranged about the ventricle, that is, an irritation of the ventricle wall without being able to determine from its existence that a definite ganglion is affected.

On the other hand, since the investigations of Kinnier Wilson, we have learned to observe rigidity of the musculature, hypertonia, as the most important symptom of localization, which points to a double-sided lesion of the nucleus lentiformis, as the cases of Wilson, M. Löwy, Deutsch, Stöcker, Economo, C. and O. Vogt show. C. and O. Vogt consider this hypertonia as a result of the suspension of the inhibition effected by the striatum upon the globus pallidus. Of course it would be necessary to show with certainty that the tonic innervation of the striped musculature really depends upon the autonomic nervous system, as at first de Boer, proceeding from Boeke's anatomic researches, tried to do, if we would prove that hypertonia signifies a symptom of the vegetative nervous system and that we have to search for a high occurrence of the autonomic in the nucleus lentiformis, as Frank supposes. De Boer's findings, that the tonus of the lower extremities diminishes after section of the rami communicantes to the plexus inchiadicus of the same extremity found support (Kure, Hiramatsu, and Naito), partly contradiction (Dusser de Barenne, Negrin y Lopez and Brücke, Saleck and Weit-

brecht). My own researches, which I made together with E. Sternschein showed that the clasping reflex of the frog under sexual excitement, a reflex that represents a true tonic shortening. According to all the statements of Fröhlich and Meyer, remains also after section of the rami communicantes of the sympathicus to the plexus brachialis. Therefore we have to disagree with de Boer's view that the tonic innervation of the skeletal musculature passes over the sympathicus. Frank supposed relations between the autonomic system and the tonic musculature, a hypothesis which likewise is not acceptable according to H. H. Meyer's arguments. Therefore we have to conclude that the tonic contraction of the skeletal musculature as well as the twitching spasm is innervated by the cells of the anterior horn. We may gain a relatively simple notion also of the connection of the globus pallidus and the innervation of the striped musculature. We know that there are connections of the nucleus mentioned with the nucleus ruber, the tractus rubrospinalis descending from the latter into the spinal cord. The axon of the anterior horn cell represents the " common extension " upon which run the impulses coming from the cortex over the pyramidal tract as well as the extrapyramidal innervations conditioned by the staritum. Hypertonia without exaggeration of reflexes is to be observed as a characteristic symptom of the disturbances of these innervations.

At the beginning we emphasized the fact that in lesions of the central nervous system disturbances in function in the sphere of the vegetative nervous system in general will be the more inconstant the more neurons are interpolated between the affected ganglion and the peripheral organ. In respect to the cortex we have to add that muscles acting bilaterally symmetrically are generally represented bilaterally (Broadbent) so that with a lesion of one hemisphere the corresponding center of the other side becomes substituting and lasting disturbances are observed only at bilateral affections. Marburg and Czyhlarz showed the importance of Broadbent's law for the innervation of the bladder. Their observations, which led to the establishment of a center for the bladder in the motor region between the center for the arm and that for the leg have since found frequent confirmation (Friedmann, Ed. Müller, Pfeifer). It was necessary, to be sure, to extend them after the experiences of the war in such a way that besides the center mentioned by them a second center is to be assumed in the region of the paracentral lobe in the neighborhood of the foot region (Bl_2). (Förster, Kleist, A. Alder.) The importance of both these centers may be summarized very simply by saying that the region joining the center for

the hip controls the discharge of urine, corresponding to the irritation of the Nn. pelvici, the field in the neighborhood of the center for the leg controls its retention, corresponding to the irritation of the Nn. hypogastrici. The failure of the first center is followed by retention, the destruction of the second by incontinence, while an irritation of these centers acts naturally but in the opposite direction.

In contrast to the transitory character of the functional disturbances in unilateral lesions, irritation symptoms of the cortex gain clinical importance. They are of diagnostic value chiefly in localized circumscribing processes in the cranial cavity in which a definite course of symptoms of irritaton, a Jacksonian epilepsy, results from pressure upon the circumscribed portion of the cortex. As is well known, epileptic attack begins in that part of the body that cor-

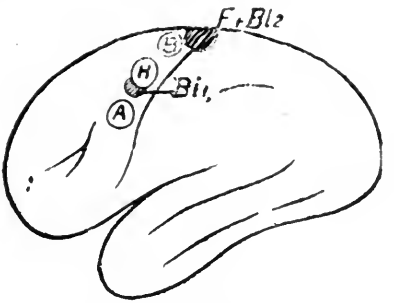

Fig. 5. Cortex. A, Arm area; B, Leg area; H, Hip area; F, Foot area; Bl_1, Expression area; Bl_2, Retention area for bladder.

responds to the directly affected part of the brain and spreads from here over the other regions of the body corresponding to their cortical localization. Therefore initial symptoms of the Jacksonian fit have a great value for local diagnosis. They point to that part of the brain that is directly exposed to the irritation. There are at hand now observations of cases in which symptoms of irritation began in certain parts of the vegetative sphere and it was possible, in fact, to establish circumscribed affections of the cortex. Oppenheim already mentions vasomotor forms of Jacksonian epilepsy. Mayer observed a patient in whom a diminution of temperature was stated in the left upper extremity during convulsive attacks that were caused by a gumma of the right motor region. Emminghaus describes epileptic perspiration of the face. Senator convulsions and profuse perspiration on one arm localized in abscess in the opposite motor region. Through an observation of Korány of epileptic sali-

vation we may suppose that salivary secretion is influenced by a region situated near Broca's center.

It is still in discussion whether the vegetative organs possess also circumscribed cortical territories analogous to the voluntary innervated portions of the body, yet we must say that attack-like appearance of circumscribed vasomotor and secretory symptoms of irritation on the extremities, such as those observed in the Jacksonion fit, deserves the attention of the physician. It points to an accompanying irritation of the motor region.

Yet to-day it is impossible to judge concerning other symptoms relating to the cortex. Thus the influence of the cortex upon the pupil is still too little analyzed to be useful for diagnosis. As previously mentioned we know that affections cerebral from the thalamus opticus may cause sympathetic ophthalmoplegia on the opposite side. An influence upon the homolateral as well as upon the contralateral pupil was observed not only from a frontal location (Ferrier, F. Franck, Bessau, Bechterew, Braunstein and others) and from a parieto-occipital location (Mislawski, Parsons, Piltz), but even from the temporal lobes (Ferrier, Luciani and Tamburim, Schäfer, Beevor and Horsley). This influence was effected upon the homolateral as well as upon the contralateral pupil, with contraction as well as dilatation of the pupil. Therefore a cortically conditioned anisocoria seems plainly not to be of value for localization.

Thus we see that there is still much vagueness concerning the central representation of vegetative functions. Yet many facts may be considered firmly established in so far that knowledge of them is not without advantage to the practitioner. Every new observation at the sickbed will advance on its part our theoretic conception. The need of the practising physician and the effort of the investigator can only be advanced by the close coöperation of both.

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NEUROSYPHILIS IN EX-SERVICE MEN.

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The cases of neurosyphilis treated at the U. S. Public Health service Hospital No. 49, Philadelphia, Pennsylvania, have thus far been limited to discharged soldiers, sailors, and marines. It is certain that these men were accepted as physically and mentally fit for military service, and, since they developed symptoms of nervous or mental disease, either during or soon after their war experiences, it would be unreasonable to assume that the malignant manifestations of lues would have developed had the men remained in their usual environments. It is therefore conceded that the cases of neurosyphilis observed have been incident to military service.

Although it is the accepted belief that neurosyphilis is always due to infection by the *Treponema pallidum* no one claims to know just how much effect certain coexisting conditions have upon hastening the development of the active invasion of the nervous system by that organism. For instance, Menninger concluded that latent syphilis, plus influenza, equals neurosyphilis. Though he may have been right in his assumption of the correctness of his equation so far as the particular cases observed were concerned, one must always keep in mind that many individuals have syphilis and influenza simultaneously and yet escape neurosyphilis. Furthermore, while it is probable that the military service of many of our patients was the exciting factor in the production of unfavorable nerve tissue reaction and the invasion by the spirochaete, nevertheless no means are at hand to determine which cases would or would not have developed neurosyphilis had they remained in civil life.

On the other hand, it is probable that many men with latent syphilis were subjected to great mental and nervous stress under military training or modern conditions of warfare and not infrequently were affected by head trauma and infectious diseases, without the production of neurosyphilis. Fordyce states that syphilis of the nervous system probably begins within a year after the occurrence of the primary lesion and that the number of cases during that early period corresponds roughly with the total number of cases of so-called late neurosyphilis. If this view is accepted, then it must

seem probable that some of the patients with neurosyphilis treated at the U. S. Public Health Service Hospital No. 49 have had neurosyphilis with few or no symptoms before they engaged in military or naval activities.

The symptomatology and serology of the disease occurring in ex-service men is probably identical with any other similar group of patients. In the cases observed, however, the average age with which the symptoms became noticeable was thirty-three years. The apparent precocity of onset is quite probably due to the low average age of the personnel of the U. S. Army and Navy during the late war.

Neuropathologists have called attention to the fact that it is impossible to correlate the degree and scope of anatomical changes with the symptomatology of neurosyphilis. It is quite generally accepted, however, that neuro-structural changes always occur and that spirochaetes always invade nerve tissue to a greater or less degree. However, it is usually difficult and quite generally impossible to determine by neurological and mental symptomatology alone the severity or scope of nerve tissue destruction. Thus the symptomatology may be due in a large measure to altered function of nerve cells resulting from toxicity, pressure of exudate, or conditions which interfere with the blood supply or other forms of nerve cell nutrition.

The specific treatment for neurosyphilis has been regarded in some quarters as a hopeless therapeutic measure. The purely custodial form of treatment, however, has met with little favor at the U. S. Public Health Service Hospital No. 49, Philadelphia, Pennsylvania. Much has been written regarding the value of arsenic, mercury, and iodides in the treatment of this grave form of lues. In the past few years much work has been done along the lines of intravenous, intraspinous, and intraventricular treatment of this condition. Some physicians, in discussing the specific treatment of neurolues, often refer to the so-called remissions that are liable to occur during the course of a treated or untreated paresis. There is nothing miraculous in the temporary slight improvement shown in such cases when not under specific treatment because the body is constantly attempting to overcome the destructive work of the spirochaete and is often able to show brave efforts in this direction. However, it is a well known fact that the outcome is unfavorable unless such individuals are aided in the struggle by medical therapy. Such has been the policy in the treatment of neurosyphilitic cases coming under the observation of the U. S. Public Health Service Hospital No. 49. It seems not out of place at this point to briefly review some of the

work accomplished by others in the specific treatment of neurosyphilis and to then briefly outline the results of such therapy among ex-service men.

Solomon, in 1916, published statistics regarding 50 systematically treated cases of general paresis. Clinical remissions occurred in 68% of the cases and 32% were clinically unimproved. Of the 68% with clinical remissions, 8% showed during the remission, negative cerebrospinal fluid findings, 32% showed weaker spinal fluid findings, and in 28% it was unaltered. Of the 32% clinically unimproved, 18% showed unaltered cerebrospinal fluid. These cases had been treated at least two years before the statistics were published. The present author was given the opportunity of studying these patients and it seemed probable that the infective agent was destroyed in many cases, as the progress of the disease appeared arrested and many of the group are now earning a living and are useful citizens in the community. Nevertheless, the patients did not become absolutely normal, as certain abnormal neurological findings with reference to pupillary changes and speech disturbances persisted. Their mentality is also obtunded.

Dercum and Gilpin have published articles during the past two years in which they state that though they obtained good results from the injection of medicated serum intraspinously, it was their opinion that the repeated spinal drainages (together with the induction of medication by channels other than the intraspinous) were responsible for the beneficial results.

Lately Fordyce, Stokes and Osborne have attempted to refute Dercum and Gilpin's theory, claiming that intraspinal medication is more effective than spinal drainage. It is worthy of note that both groups of opposing authorities have based their results upon clinical and serological findings, as well as citing diverse physiological theories concerning the spinal fluid treatment. In the cases cited in their respective papers, Dercum and Gilpin used first the Swift-Ellis treatment, then the spinal drainage; whereas, Fordyce, Stokes and Osborne changed from the spinal drainage to the Swift-Ellis treatment in their cases. It is, therefore, probable that the question of relative effectiveness of the two methods is not definitely settled.

Lowrey, who had much experience with all forms of treatment for neurosyphilis, including the intra-ventricular method, states in a personal communication of recent date the following:

"With respect to the treatment of neurosyphilis, I still believe that the most efficacious method of treatment is the intensive intravenous method. Intraspinous therapy is, in my opinion, chiefly of

value in early cases of tabes suffering from much pain. It is a question whether the diarsenol is the valuable thing in this treatment, or whether it is the introduction of foreign serum. I do not myself believe that any particular method or scheme of treatment will always work. I think, therefore, that spinal drainage may be of some assistance in favorable cases; that is, in cases that would react well to any method of intensive treatment, and of absolutely no assistance in the other cases. In other words, I believe the theory of it is sound, but that there is no 100 per cent or even 75 per cent method for the treatment of paresis, unless the cases are always gotten early, preferably before the outbreak of clinical symptoms, and even then the results will depend in part at least, upon the location and type of the most advanced lesions."

More than eighty cases of neurosyphilis have been treated at the U. S. Public Health Service Hospital No. 49; forty-two of these are still under care; the others have either been discharged or transferred to other institutions. Besides the hospital patients, cases of neurosyphilis are being treated at the U. S. Public Health Service Hospital No. 49, under the direction of A. J. Ostheimer, Surgeon (Reserve), Chief of the Neuro-Psychiatric Section, Third District, Veterans' Bureau. These out-patients remain at their homes, reporting at the hospital for treatment.

The following method of treatment is being used at the U. S. Public Health Service Hospital No. 49:

The patient is given a six weeks' course of neosalvarsan intravenously. Mercurial inunctions and potassium iodide are also administered. Following the intravenous medication, spinal drainage is instituted. In addition to these specific measures, special attention is given to the regulation of diet, excretion, exercise, and occupation. In order to improve the general physical tone, hydro- and electrotherapy are utilized, the principle being to treat the case rather than the disease.

In regard to the spinal drainage treatment, the greatest difficulty is encountered in securing the coöperation of patients who have been hurt during previous spinal punctures. Fordyce gives the excellent advice to do lumbar punctures in all cases of primary and secondary syphilis, before the patients are discharged as cured. It might be well to add to his suggestion that extreme caution should be taken to prevent pain during the procedure, because many first punctures have caused such suffering in patients that they have dreaded a repetition of the operation. During the courses of treatment at U. S. Public Health Service Hospital No. 49, the lumbar

puncture needle is never inserted more than once in an attempt to secure drainage. If unsuccessful, the withdrawal of fluid is postponed until a later time for the sake of the patient's comfort.

The author is of the opinion that in repeated spinal drainages, the oblique or diagonal mode of puncture is capable of unpleasant results. When that method is used the operator frequently strikes nerves, causing excruciating pain to the patient. It is possible that repeated nerve trauma of this sort might cause actual damage to the nerves affected.

It is probable that a case of syphilis of the nervous system should be treated for at least two years before any positive statement is made regarding the eventual outcome or value of specific therapy. It seems best, then, to consider in this preliminary report only those patients who were treated for at least one year. Of the twelve cases regularly treated for one year or more, four can be said to have shown absolutely no clinical improvement; two of the latter were so resistive that the spinal drainage therapy could not be conducted. The improved patients have shown various degrees of change for the better, physically, or mentally, or both. No one can be said to have actually recovered. It must be remembered, however, that even had the cases remained stationary the therapy would not necessarily have been ineffective, since we are dealing with a disease which is usually progressively fatal in its course. The blood Wassermann has become negative in three cases; spinal fluid Wassermann is now negative in two cases; and both the blood and spinal fluid Wassermanns are negative in one case; in this latter all of the other spinal fluid findings are negative. Three patients have parole of the hospital grounds. It is questionable whether they could be cared for at home because of their liability to indulge in various excesses which might impede their treatment.

In the spinal fluid of the twelve patients treated regularly by spinal drainage for a year or more, only two have shown no reduction in the gold curve and cell count. The pleocytosis was reduced much sooner than the gold curve. It is worthy of note that it required three months to produce any great change in the gold reaction. In the recent work in the Mayo Clinic from which Stokes and Adams drew their previously mentioned conclusions, the patients were given spinal drainage therapy, averaging five weeks' duration in each case. If our results had been checked up after five weeks' treatment, striking changes in the gold curves would not have been noted, showing that only lengthy trials will determine the value of various forms of therapy.

It is regretted that definite results in treatment cannot be stated in regard to the rest of the eighty cases treated. The amount of work upon them represents a total of 1579 Wassermann examinations, 868 spinal punctures; and 1356 intravenous injections of arsenic preparations in less than one year. Since these cases have been under treatment for such a short period it is too soon to draw any definite conclusions as to the outcome. However, it may be stated that one could not become optimistic in regard to the prognosis of neurosyphilis from observation of these eighty cases, for after all, the only way to do really helpful work in regard to this dread disease is to prevent it. The pitiful point is that had the treatment of primary and secondary syphilis been thoroughly given, the neurolues might never have occurred.

TABLE 1

GOLD CURVE AND CELL COUNTS BEFORE TREATMENT AND AFTER TREATMENT FOR ONE YEAR

CASE NUMBER	1	2	3	4	5	6
Cell Count when patient admitted to hospital....	33	22	41	30	44	27
Cell Count after treatment for one year.....	3	4	1	2	3	7
Gold Curve when patient admitted to hospital....	5544311000	5555532100	5555553100	4333210000	5555543100	5554310000
Gold Curve after treatment for one year.....	0001110000	0123321000	0000000000	1223343210	2233332100	0011221000

CASE NUMBER	7	8	9	10	11	12
Cell Count when patient admitted to hospital....	15	18	30	12	60	14
Cell Count after treatment for one year.....	5	22	2	14	55	1
Gold Curve when patient admitted to hospital...	5555553210	5555554310	4433321000	5555531000	5555543100	5555432210
Gold Curve after treatment for one year.....	2333321100	2444333210	0012321100	5555431000	4455432210	2233321100

BLOOD CREATININ FINDINGS IN FIVE CASES OF CORPUS STRIATUM DISORDER.*

By Theophile Raphael, M.D., and Frederick C. Potter, M.D., of Kalamazoo, Michigan.

The prominence of disturbance in muscle tonus and general motility characteristically obtaining in affections of the corpus striatum, is strongly suggestive, inferentially at least, of the possibility of concomitant alteration in muscle metabolism. It was deemed of interest, therefore, to study the blood creatinin in a series of such cases.

Procedure.

A group of five cases (table 1) was available for this study, including two cases of paralysis agitans, two of Huntington's chorea, and one of congenital double athetosis (Vogt's syndrome). These cases, males, were all typical as to specific disturbance and, with the exception of well compensated mitral lesions in two (1 and 4), were all, otherwise, clinically negative.

Preliminary blood urea and urine examinations, to exclude the possibility of retention or excretion defect due to renal disorder, showed (table 2) in the case of the former, values well within normal (1) limits and, as regards the latter, completely negative findings in cases 1, 4, and 5, and a trace of albumin in case 2 and a trace of albumin with an occasional granular cast in case 3, features of negligible significance from the standpoint of this study, particularly in view of the ages of these subjects and the definitely normal blood urea findings.

All of the patients comprising this series were placed upon a strictly meat free diet and kept at rest in bed, to preclude the possibility of interference dependent upon extrinsic activity.

Commencing on the sixth day of the diet, blood creatinin determinations (table 3) were made in each case (according to the technic of Myers and Killian, (2) utilizing the Myers colorimeter (3), on three occasions, at intervals of from one to three days. Because of collateral interest, study was also made of the blood sugar tolerance (table 4). This procedure was carried out on the basis of the

* From the Kalamazoo State Hospital, Kalamazoo, Michigan.

TABLE 1

CASES

CASE	NUMBER	DIAGNOSIS	AGE	DURATION
1—C. B. S.	18443	Paralysis Agitans	49	16 years
2—B. S.	16326	Paralysis Agitans	58	6 years
3—F. S.	17725	Huntington's Chorea	64	8 years
4—J. W. C.	14921	Huntington's Chorea	56	20 years
5—G. A. C.	18590	Double Athetosis	47	Congenital

TABLE 2

URINE AND BLOOD UREA FINDINGS

CASE	DIAGNOSIS	BLOOD UREA (mg. per 100 c.c.)	DATE	URINE	DATE
1—C. B. S.	Par. Agit.	23.62	4/19/21	Negative	4/19/21
2—B. S.	Par. Agit.	34.62	4/19/21	Negative save for trace of albumen	4/18/21
3—F. S.	Chorea	28.25	4/19/21	Trace of albumin and occas. gran. cast	4/19/21
4—J. W. C.	Chorea	27.50	4/19/21	Negative	4/19/21
5—G. A. C.	Double Ath.	30.25	4/19/21	Negative	4/19/21

TABLE 3

BLOOD CREATININ VALUES

CASE	DIAGNOSIS	BLOOD CREATININ (mg. per 100 c.c.)	DATE	BLOOD CREATININ (mg. per 100 c.c.)	DATE	BLOOD CREATININ (mg. per 100 c.c.)	DATE	AVERAGE
1—C. B. S.	Par. Agit.	0.404	4/22/17	0.388	4/23/21	0.475	4/27/21	0.405
2—B. S.	Par. Agit.	0.242	4/28/21	0.247	4/30/21	0.266	5/ 2/21	0.251
				AVERAGE OF CASES 1 AND 2				0.328
3—F. S.	Chorea	0.404	4/22/21	0.333	4/23/21	0.262	4/27/21	0.333
4—J. W. C.	Chorea	0.285	4/22/21	0.304	4/23/21	0.323	4/27/21	0.337
				AVERAGE OF CASES 3 AND 4				0 335
5—G. A. C.	Double Ath.	0.242	4/28/21	0.252	4/30/21	0.261	5/ 2/21	0.251

TABLE 4

BLOOD SUGAR TOLERANCE

CASE	DIAGNOSIS	DATE	BLOOD SUGAR TOLERANCE				
			Fasting	After ½ hr.	After 1 hr.	After 2 hrs.	After 3 hrs.
1—C. B. S.	Par. Agit.	5/ 5/21	0.102%	0.121%	0.116%	0.129%	0.134%
2—B. S.	Par. Agit.	5/ 6/21	0.092%	0.200%	0.189%	0.121%	0.070%
3—F. S.	Chorea	4/28/21	0.110%	0.137%	0.113%	0.112%	0.100%
4—J. W. C.	Chorea	5/ 4/21	0.099%	0.190%	0.140%	0.140%	0.111%
5—G. A. C.	Double Ath.	5/ 7/21	0.095%	0.122%	0.185%	0.134%	0.097%

ingestion of 1.75 grams of glucose per kilogram of body weight, dissolved in 2.5 cc of water per gram of glucose, as recommended by Janney and Isaacson, (4) and the blood sugar estimations were made according to the technic of Myers and Bailey, (5) also with the utilization of the Myers colorimeter.

Results.

It will be seen from table 3 that the blood creatinin values in all five cases show but little variation, in themselves, and as compared with one another except that they seem to be slightly lower in case 5 (double athetosis) than in the others. When compared with the so-termed standard norm (.8-2 mg. per 100 c. c. blood) 6, the findings, in these cases, representing corpus striatum disorder, will be seen to be very definitely and consistently below the normal minimum. The exact significance of this finding is not wholly clear altho it lends a certain emphasis to the presumption of the existence in these cases, of altered muscle metabolism. While it is probable that the somewhat diminished total muscle mass noted in such cases may be of some significance in this connection, yet, it will also be readily seen that no mean rôle is played by the change in muscle wear-and-tear dependent upon intrinsic disturbance of motility and muscular tonus, in the absence of the possibility of specific replacement, due to the restricted diet, and the generally lowered systemic vitality induced by the disease itself. This conception is borne out somewhat by the sugar tolerance curves which indicate, with the possible exception of case 1, relatively prompt utilization of the ingested glucose.

Of especial interest in this connection is the report by Janney, Goodhart, and Isaacson (7) of uniformly lowered blood creatinin values (.27-.55 mg. per 100 c. c. of blood) in a series of five cases of muscular dystrophy.

Summary.

It appears from this study of five cases, representing three syndromes due to corpus striatum disorder, that the blood creatinin values obtaining in affections of this region are very definitely below the normal minimum, affording some indication thereby, of the possibility of concomitant alteration in muscle metabolism.

Grateful acknowledgment is made to Mr. A. Campbell, and Miss L. Cutler, of the Laboratory, for technical assistance in this work, and to Dr. H. Ostrander, Medical Superintendent, for permission to undertake and report this study.

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Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

Stated Meeting Held February 7, 1922, Dr. Foster Kennedy, Presiding

DYSSYNERGIA CEREBELLARIS MYOCLONICA, PRIMARY ATROPHY OF THE DENTATE SYSTEM

Dr. J. Ramsay Hunt

[Author's Abstract]

Some years ago, under the title Dyssynergia Cerebellaris Progressiva or Chronic Progressive Cerebellar Tremor, the author directed attention to a peculiar disorder of motility, which he regarded as a definite clinical type of nervous disease. This affection was characterized by generalized intention tremors, which began as a local manifestation and gradually extended to other parts of the voluntary muscular system. The extremities, and more especially the arms, showed the greatest degree of involvement. When this tremor disturbance was subjected to careful analysis there was found associated with it a disorder of muscle tone and of the ability to measure, direct and associate muscular movements, the clinical manifestations of which were dyssynergia, dysmetria, adiadokokinesis, hypotonia and asthenia. All of these symptoms, including the volitional tremor, which was an extreme expression of the underlying disturbance of muscle tone and synergy, showed the existence of a fundamental disorder of cerebellar function. The author, therefore, regarded the affection, with its progressive tendency, chronic course and well-defined cerebellar symptomatology, as "an organic disease caused by degeneration of certain special structures of the cerebellar mechanism, which were concerned in the regulation of the tonus and synergies of muscles."

Since the author's original publication he has had occasion to observe another group of cases which combined the symptomatology of Dyssynergia Cerebellaris Progressiva and Myoclonus-epilepsy. There was the progressive dyssynergia characteristic of a cerebellar disorder, in association with epilepsy and myoclonus. Here, as in the group of cases uncomplicated by myoclonus-epilepsy, the movements of the extremities showed the greatest degree of disturbance.

This form of Dyssynergia, which he would term *Dyssynergia Cerebellaris Myoclonica*, he has also observed in association with Friedreich's ataxia, a combined cerebello-spinal involvement, which is not infrequent in the history of cerebellar system disease. In one of these cases careful pathological investigations were made which throw a considerable light on the origin and anatomical basis of the cerebellar portion of the symptomatology. There was a primary atrophy of the efferent dentate system of the cerebellum, and this system was regarded as the essential neural mechanism underlying the production of the cerebellar or intention tremor.

Clinical Summary of Four Cases

Case I.—Myoclonus-epilepsy began at the age of 17, and was followed five years later by symptoms of Dyssynergia Cerebellaris Progressiva, viz., generalized intention tremors and scanning speech, associated with dysmetria, dysdiadokokinesis, hypotonia and asthenia. With the exception of epilepsy, myoclonus and dyssynergia, there were no other evidences of organic disease of the nervous system. It is of interest to note that the dyssynergia was appendicular rather than trunkal in distribution and that higher types of movement were chiefly affected. There was no familial history of either myoclonus-epilepsy or cerebellar disease.

Case II.—A girl, aged 19, onset of myoclonus-epilepsy, at the age of 7. Associated with this was a progressive dyssynergia of cerebellar origin, affecting more especially the speech and extremities.

There were no other evidences of organic disease of the nervous system. The chief disorder of cerebellar function was of articulation and the movements of the extremities. The gait and general equilibrium also showed some disorder of cerebellar function which was accentuated by the severe type of myoclonia which was present. In this case the dyssynergia, while preponderantly appendicular in distribution, also involved to some extent the trunkal musculature. There was no history of the familial occurrence of either myoclonus-epilepsy or cerebellar disease.

Case III.—Myoclonus-epilepsy of 26 years' duration, associated with symptoms of Dyssynergia Cerebellaris Progressiva, viz., Cerebelar Dysarthria, Intention Tremor, Dysmetria and Adiadokokinesis, affecting chiefly the volitional movements of the extremities.

With the exception of the myoclonus-epilepsy and dyssynergia, no other symptoms of organic disease of the central nervous system could be found. Symptoms indicative of multiple sclerosis, Friedreich's ataxia or gross cerebellar disease were not present. There was no familial history of either disorder.

Case IV.—A girl, 15 years of age, with nocturnal epilepsy, myoclonia and slight cerebellar dyssynergia of three years' duration.

The case is of interest as representing a somewhat earlier stage of the Dyssynergia Cerebellaris Myoclonica. Here again there is no family history of myoclonus-epilepsy or of cerebellar disorder.

Remarks: The association of Cerebellar Dyssynergia and Myoclonus-epilepsy in this group of cases suggests the occurrence of two independent nervous disorders in one individual. Combined forms of the various congenital, familial and hereditary types of nervous disease are by no means uncommon, and these associations are especially frequent in the spinal and cerebellar groups of system diseases. Jendrassik, who has devoted particular attention to this subject, records many such combinations. Such combinations, however, are rare, and show merely a predisposition to the two disorders in the same individual, and would not necessarily indicate any essential relationship between them. On the other hand, little is known, at the present time, of the pathology and localization of myoclonus. Its occurrence, therefore, in conjunction with a special type of cerebellar disease, is not without interest, and may have a deeper pathological significance than would appear.

Dyssynergia Cerebellaris Myoclonica Associated with Friedreich's Ataxia

The author also presents another group of cases in which myoclonus-epilepsy and Dyssynergia Cerebellaris Progressiva were associated with symptoms of Friedreich's ataxia.

Summary of Case V.—A man, aged 36, with symptoms of myoclonus-epilepsy since his twenty-first year. Previous to this there were symptoms of Friedreich's ataxia and progressive cerebellar tremor which steadily progressed. Pathological study shows the typical spinal lesions of Friedreich's ataxia associated with a Primary Atrophy of the Efferent Dentate System of the Cerebellum, viz., considerable diminution in number and extensive atrophy of the cells of the dentate nucleus, with secondary atrophic changes in the superior cerebellar peduncles.

This case differs from those described in the previous series in two respects, viz., the association with Friedreich's ataxia and the familial incidence: a twin brother suffering from the same disease. The first symptoms of the cerebello-spinal disorder made their appearance in the early juvenile period. The myoclonus-epilepsy did not become manifest until the twenty-first year. The presence of the spinal symptoms of Friedreich's ataxia would mask many of the typical symptoms of cerebellar disease. The existence, however, of marked intention tremors and the scanning speech show very clearly the existence of cerebellar involvement (cerebellar tremor), and this was confirmed by histological examination.

Summary of Case VI.—A man, aged 29 years, the twin brother of Case V. Symptoms of dyssynergia cerebellaris and Friedreich's ataxia for the past ten years, gradually increasing in severity. Myoclonia made its appearance five years ago and epilepsy is only of three years' duration. This case, like that of his brother, presents symptoms of Dyssynergia Cerebellaris Progressiva, Myoclonus-epilepsy and Friedreich's ataxia in combination.

Histological Examination of the Central Nervous System

Summary of Pathological Changes: The histological study of the central nervous system in Case V showed the typical spinal cord changes of Friedreich's ataxia. There was atrophy of the posterior columns of the cord which could be traced to the nuclei of Goll and Burdach in the medulla. Atrophic changes were also present in the direct cerebellar tract of Flechsig and the tract of Gowers (ventral and dorsal spino-cerebellar tracts). The columns of Clarke were atrophic and there were also some changes in the area occupied by the spino-thalamic tracts.

There was no definite atrophy of either the direct or crossed pyramidal tracts, and the slight pallor in certain areas he would ascribe to degeneration of other non-pyramidal fibers which belong to this region.

Histological study of the brain stem and cerebellum showed the following condition: There was an extension into the medulla of the system atrophies of the cord, viz., the direct spino-cerebellar tracts. The atrophy of the posterior columns apparently ceased at their termination in the nuclei of Goll and Burdach, for the fibrae internae arcuatae were well preserved and the corpus restiforme well developed.

The other important and essential lesion was an atrophy of the motor cells of the corpus dentatum of the cerebellum and of their efferent neurons in the superior cerebellar peduncles. There was no atrophy of the other cerebellar systems, and none of the nucleus ruber. The lesion was therefore confined to this short and very important internuncial common path which conveys the motor impulses of cerebellar origin to the spinal pathways. The lesions were therefore both spinal and cerebellar. The spinal lesion was that common to Friedreich's ataxia; the cerebellar lesion the author would regard as a special form of system disease, viz., primary atrophy of the efferent dentate system of the cerebellum.

Primary Atrophy of the Efferent Dentate System and Its Relation to Dyssynergia Cerebellaris Progressiva (Progressiva Cerebellar Tremor)

At the present time we may recognize the following pathological types of cerebellar atrophy: the Cerebellar Cortical Type of André-Thomas, the Olivo-Cerebellar Type of Holmes, and the Olivo-Rubro-Cerebellar Type of Le Jonne and Lhermitte. To these various types the author would add the Primary Atrophy of the Dentate System. This is a system disease characterized by atrophy of the cells of the dentate nucleus, and thinning of the superior cerebellar peduncles. All other important structures of the cerebellum, the cortex, the olivo-cerebellar and ponto-cerebellar systems, are intact. There already exists in medical literature a number of isolated facts tending to show the close connections between what the author terms the dentate system and the cerebellar or intention tremor. The relation of the intention tremor to the cerebello-rubral system

was emphasized some years ago by Gordon Holmes. Sanders and Touch have also reported cases of intention tremor in association with lesions of the dentate nucleus. In the experimental field, the work of Ferrier and Turner on monkeys has also shown the relation of the cerebellar or intention tremor to the efferent cerebellar system.

As the pathological changes in the case just recorded are limited to the neodentate system of the cerebellar mechanism, it is but natural that the more recently acquired and more highly differentiated motor activities should show the greatest degree of involvement. This is a system which is related to the neo-cerebellum and its recently acquired function. It is for this reason, the author believes, that the affection is predominantly appendicular in its manifestations and the intention tremor so conspicuous a symptom. The neodentate portion of the efferent cerebellar system shows a greater vulnerability to abiotrophic degeneration.

The clinical syndrome which we term *Myoclonus-epilepsy* probably includes a variety of clinical and pathological types. Lafora and Glueck, and more recently Westphal and Sioli, have described a chronic progressive disorder of the central nervous system characterized by epilepsy, myoclonus and a progressive dementia. In one case, typical cerebellar symptoms were present, with scanning speech, cerebellar ataxia, and tremor. Autopsy revealed in both cases a peculiar amyloid degeneration of the ganglion cells which was widely distributed in the various aggregations of gray matter in the brain and spinal cord.

An interesting case of cerebellar atrophy associated with myoclonus has been described by Haenel and Bielschowsky. In addition to the typical clinical picture of a cerebellar disorder there were also symptoms of paramyoclonus multiplex. Careful histological examination showed only an extensive atrophy of the cerebellar cortex, of the inferior olive and the olivo-cerebellar tracts. Pathologically the atrophy was primary and confined to certain definite systems of the cerebellum, and belonged to the olivo-cerebellar type of cerebellar atrophy. It is interesting to note that the essential lesions in this case were confined to the cerebellar cortex and the cerebello-fugal system of the first order. The slight changes in the nucleus dentatus and superior cerebellar peduncles, Bielschowsky regarded merely as secondary in character, following atrophy of the cortical neurons. If myoclonus, therefore, has any functional relationship to the cerebellum it may exist in association with both types of primary cerebellar atrophy, viz., the olivo-cerebellar type described by Holmes and the atrophy of the efferent dentate system.

Discussion: Dr. S. P. Goodhart said: Dr. Hunt has added very considerably to a rather rare set of cases. I have not had the opportunity to see so many. I think it would be interesting to consider Dr. Hunt's proposition which he has sustained by histological examination and theoretical hypothesis. He has taken an unusual conception of cerebellar involvement. Our own idea does not embrace myoclonic movements. It is suggestive to think that the cerebellum is associated with that type of movement as explained by Dr. Hunt.

I think, however, it is well to consider the relationship of the Corpus striatum in the cases of progressive cerebellar dyssynergia. The Corpus striatum is certainly involved in some cases, and it seems to me that before we can definitely place this syndrome there should be some more investigation and checking up of autopsy findings, giving special attention to the larger cerebellar system and taking the Corpus striatum particularly into consideration. In one case particularly—(Dr. Hunt will recall it)—a very definite lesion was found in the striatal wall, and there was also involvement of the nucleus dentatus. In view of the fact, however, of the peculiarities of the striatal movements, it would be unsafe to place the entire syndrome in the literature without considerable confirmatory evidence. I think that Dr. Hunt has given us an admirable conception and has put us in contact with a syndrome not often seen. I should like to know why Dr. Hunt associates this myoclonia, so frequently seen with epilepsy, with the cerebellar mechanism.

Dr. E. D. Friedman said: Dr. Hunt has postulated a lesion of the cerebellar pathways of the superior peduncles in his cases. If that is so, may I ask Dr. Hunt whether he has noticed any choreiform movements in his cases? Both Förster and Bonhoeffer have associated choreiform movements with lesions involving the efferent cerebellar pathways of the brachium conjunctivum which connect the nucleus dentatus with the nucleus ruber of the opposite side. No one, to my knowledge, has thought of associating lesions in this area with myoclonic movements, but rather with movements of a choreiform nature.

Dr. J. Ramsay Hunt, closing, said: Cases reported by me did not show motor disturbances of the choreiform type. There were present myoclonus and intention tremor, but no chorea in the technical sense.

Replying to Dr. Goodhart, these cases were put forward as representing a clinical type and not a definite pathological type. For example, we recognize myoclonus as having a wide range of symptomatology, and we also recognize epilepsy as having the same wide range of incidence. When these two manifestations appear in conjunction, we recognize myoclonus-epilepsy. The reason for this association we don't know, as it is probable that several pathological conditions are involved in myoclonus-epilepsy. Nevertheless, it constitutes a clinical type or syndrome. In this sense I would regard dyssynergia cerebellaris myoclonica.

Here is a group of cases, of which six have come under my personal observation, in which there were present myoclonus-epilepsy and a progressive cerebellar dyssynergia. The relation of these symptoms, one to the other, cannot be determined at this time. My pathological studies of one case, associated with Friedreich's ataxia, showed a primary system disease of the cerebellar mechanism, viz., atrophy of the dentate nucleus and of the superior peduncles. The cerebellar symptoms I would refer to atrophy of the dentate system. This is the chief efferent system of the whole cerebellar mechanism, and bears the same relation to the cerebellum that the pallidal system

bears to the corpus striatum. The relation of myoclonus to a cerebellar disorder is not without interest. In Bielschowsky's case there was a pure system disease which involved the cerebellar cortex and the connections with the dentate system. There were also atrophic changes in the dentate system, but these Bielschowsky regarded as secondary. It is, however, significant that my case, which involved the dentate system with its motor neurons of the second order, and Bielschowsky's case, which involved the motor system of the first order, were both associated with myoclonus. So far as I am aware this sysptom has not been reported with other types of cerebellar system disease.

I refer to my conception of the Static and Kinetic system of motility, and to the cerebellum as the essential organ for the control of static or postural synergies. It is conceivable that disorders of the posturing mechanism might give rise to myoclonic types of movement, the result of a sudden break in the postural control, the myoclonus being a compensatory reaction to sudden loss of postural control. This is purely speculative, but is worthy of consideration in attempting to interpret myoclonus in association with cerebellar disease.

SOME RECENT EXPERIMENTS ON THE NATURE OF THE NERVE IMPULSE

Dr. E. Newton Harvey, Princeton University
(by invitation)

[Author's Abstract]

Although it is quite certain that nothing *flows* along a nerve, something is *transmitted*—the nerve impulse. Galvani (1786) and du Bois Reymond (1843) identified the impulse with electricity, but Helmholtz's (1852) measurement of the velocity indicated a process too slow to be compared with the flow of electricity in a wire.

We may inquire whether the process is physical (comparable to a wave motion like sound) or chemical (comparable to an explosion trail in gunpowder). In general, physical processes are little affected by temperature; chemical processes increase two or three times for a 10° rise in temperature. Wave motions suffer diminution as they progress; explosion trails are self-propagative processes.

All experiments indicate that within normal limits the rate of the nerve impulse is greatly affected by a rise in temperature. This can be most easily studied in a jelly fish, *Cassiopea*, made of a disc of tissue covered with muscle and a nerve network. Rings of tissue like a doughnut can be cut from the disc, and a nerve impulse started in one direction which passes round and round the disc with a velocity of about 0.5 m. per second. The impulse is entrapped and can be seen moving round because the muscles are stimulated to contract with each revolution. For the 18°–28° temperature interval, the temperature coefficient Q_{10} is 2.4.

Such rings allow us to answer the second question, whether the impulse is self-propagative and will move forever. I have kept a nerve impulse moving in such a ring for eleven days continuously with no change in rate. The impulse traveled 537 miles. It stopped after eleven days only because regenerating tissue gave rise to impulses which counteracted the entrapped impulse.

The evidence points to the view that the nerve impulse is at base a chemical process, despite the fact that no chemical changes can be directly demonstrated. The action current shows that electrical changes are very important, so that we may regard the impulse as electrochemical in nature.

Lillie (1918) has pointed out a perfect analogy in the transmission of a wave of activation in passive iron. Passive iron is iron so treated that it fails to dissolve in dilute nitric acid. It behaves like a noble metal. If touched with ordinary or active iron, it becomes active also, and the activity is transmitted from the point touched as a wave which can be followed by the eye. The following characteristics are common to both nerve transmission and propagation of activity in passive metal wires: (1) The wave is a propagation of negativity or negative potential, and the negativity at one region activates ("stimulates") the conductor at the next region. (2) All kinds of stimuli (mechanical, chemical, electrical) will activate. (3) Activation by the electric current is a polar phenomenon occurring at the cathode (Pflueger's law). (4) Activation by the electric current is more effective as the current is suddenly increased in intensity (du Bois Reymond's law). (5) The phenomenon of electrotonus appears in passive iron as in nerves. (6) After activation, a refractory period exists when another impulse will not be transmitted. (7) Inhibition phenomena appear in passive iron as in nerves. (8) Unidirectional passage of a synapse is observed with passive iron and nickel. The wave of activation is easily transmitted from passive Ni(sensory) to passive Fe(motor), but not transmitted from Fe(motor) to Ni(sensory).

Discussion: Dr. D. J. Edwards, Cornell Medical School (by invitation), said: It has been very interesting to me to listen to Dr. Harvey's very direct presentation of the puzzling problem of neurophysiology. It has been customary for physiologists to lay out in a very painstaking way the elements of conduction and the conditions that modify conduction, but they have always passed very quickly over the nature of the propagated disturbance in the nerve. It is just that problem that Dr. Harvey has attempted to-night. One feature of the discussion has been the application to a fundamental physiological problem of research in a field which appears at first to be entirely unrelated. You have seen with what success these unrelated fields have yielded elucidation of the problem. It shows how difficult it is to predict the ultimate application of fundamental research. Another feature of this discussion has been the relatively rapid development of this subject in recent years. About seventy

years ago Johannes Mueller asserted that we should never be able to measure the passage of the nervous impulse. Five years later Helmholtz demonstrated it by a method so simple that every first year medical student may prove it. Some years later Fillié called attention to the minimal oxygen content that is necessary for propagation of the nervous impulse, and Waller called attention to the CO_2 output of the nerve when it is undergoing conduction. These observations laid a background for the chemical conception of the nervous process. A few years later Keith Lucas began his researches and laid the foundation for the work of to-night by showing that the propagation is without decrement, that is, the process goes on without being reduced, and this has led up to the chemical conception of the nervous process which Dr. Harvey has emphasized and brought out. The importance of the bearing of certain physical analogies on the nature of the process has been applied with great exactitude in the result of Dr. Harvey's researches.

Dr. I. Abrahamson said: I would like to say a word of congratulation to Dr. Harvey on his work. This is the most excellent and precise presentation which I have listened to for a long time.

Dr. Joshua Rosett said: I am gratified to find that the latest work in physiology has resulted in a conception of the nature of the nerve impulse that is very much like the conception formed by Herbert Spencer, and which always appealed to me as sound. Spencer discussed the subject over forty years ago, and his line of reasoning is almost the same as that followed by Dr. Harvey in his excellent presentation this evening. Spencer, too, rejects the hypothesis of an electrical nature of the nerve impulse as untenable, mainly on the grounds of the non-dissipation of the nerve impulse as it travels along the fiber and because of the vast difference in the respective rates of propagation of the two impulses. The excellent illustration employed by the speaker this evening of a wave of isomeric change in a passive iron wire, brought about by a small disturbance, is paralleled by an illustration employed by Spencer in connection with the same subject. Spencer speaks of the transformation from black amorphous to white crystalline antimony in a wire of that metal occurring when a slight disturbance—a light tap, the application of a hot object, etc.—is communicated to the wire at any point.

Dr. Harvey (closing) said: Herbert Spencer's idea is a very similar one, and it would differ apparently only in this: in the case of antimony the whole wire changes from one allotropic form to another, but in the passive iron phenomenon the iron becomes coated with some sort of oxide film which makes it take a different potential to ordinary iron when the two are connected. If we are to consider that the white antimony has a different potential to the black antimony, we shall have an electrical change, and therefore a similar analogy.

CURRENT LITERATURE

II. SENSORI-MOTOR NEUROLOGY.

1. PERIPHERAL NERVES: RADICULAR SYNDROMES.

Roussy, G., and Cornil, L. NON-FAMILIAL PROGRESSIVE HYPERTROPHIC NEURITIS IN AN ADULT. [Presse Médicale, 1919, XXVII, July 24, p. 410.]

The writers reported to the Paris Neurological Society on July 3, 1919, a case of hypertrophic neuritis which reproduces anatomically the histological type described by Dejerine and Sottas, and others. There were no family nervous antecedents. The onset was at the age of 40. The Aran-Duchenne type of progressive muscular atrophy appeared in the upper limbs with ataxy, reaction of degeneration, Rombergism, intention tremor, loss of tendon-jerks in upper limbs and loss of left knee and ankle-jerks; no oculopupillary signs; no nystagmus. A biopsy showed degeneration of Schwann's sheath, with changes in the central axon, the presence of many small regenerated axons, and slight hyperplasia of the conjunctive tissue. [Leonard J. Kidd.]

Andérodias. PARALYSIS OF THE EXTERNAL POPLITEAL NERVE AFTER PARTURITION. [Gaz. Heb. Sci. Med. de Bordeaux, 1919, XL, July 6, p. 152.]

Andérodias reported to the Bordeaux Obstetrical and Gynæcological Society on June 24, 1919, two cases of paralysis of the external popliteal nerve occurring five and eight days, respectively, after parturition. The symptoms were wholly motor. In both cases labor had been difficult, with a certain amount of infection. Spontaneous recovery in about three weeks. Although compression of the lumbo-sacral plexus by the fœtal head is generally invoked as the cause of this rather rare form of puerperal palsy, yet it is more probable that an infective neuritis is responsible for it. Andérodias suggests that possibly there may have been in his cases a compression of an abnormal root of the nerve. [Leonard J. Kidd.]

Adson, Alfred W. A CLINICAL STUDY OF NERVE ANASTOMOSIS. [Annals of Surgery, Aug., 1919, p. 157.]

The author gives the results of his clinical study of forty-one cases of nerve anastomosis. Cases in which post-operative records are shorter than sixteen months are not included in his report. His studies indicate that: (1) regeneration of the peripheral nerves may be accomplished by

nerve anastomoses; (2) the degree of regeneration depends on (a) the duration of time between injury and repair, the shorter the period the greater the regeneration: the possibility of regeneration is very slight after three or four years; (b) on actual loss of nerve tissue, and (c) retraction of the severed ends; (3) in the technique of nerve repair (a) no covering is necessary if the freshened ends can be sutured in close apposition, (b) if an intervening gap remains, it should be tubulized, preferably by fascia, (c) if the gap is longer than 5 c.m. tendon transplantation or arthrodesis should be considered instead of nerve anastomosis, (d) autogenous transplants may be considered for short gaps, but they are of no greater value than tubulization, (e) in all technique the wound should be free from hemorrhage and infection and the nerve ends should not be traumatized, (f) during the post-operative convalescence the paralyzed muscles should be massaged and passive movements should be used. [Leonard J. Kidd.]

Lhermitte, J. Commotion of the Thoracic Spinal Cord, with Necropsy. [Presse Médicale, 1919, XXVII, July 24, p. 410.]

Lhermitte reported to the Paris Neurological Society on July 3, 1919, the case of a man aged 23, who, immediately after a fall from a height of five mètres, showed clinical signs of complete interruption of the thoracic spinal cord which lasted for four days. Then appeared defensive reflexes and Babinski's sign. Death on the fifteenth day by disseminated bronchopneumonia. Necropsy showed complete integrity of the spinal cord, and absence of meningeal lesions. The spinal cord seemed normal, but microscopical examination showed the presence, in the upper part of the thoracic spinal cord, of the acute primary degeneration described by Claude and Lhermitte. There was no softening nor hemorrhage, and no distension of vessels. This case shows that direct spinal cord commotion can occur just as much in peace as in war. [Leonard J. Kidd.]

2. CRANIAL NERVES.

Welton, Carroll B. Optic Neuritis and the Etiologic Relation of Diseased Tonsils.

Systemic diseases of many kinds and in many parts of the human organism from infection in the tonsils are of common occurrence. There can be no doubt of this casual relationship of the tonsils to distant diseased conditions from the proof offered in very recent years by a mass of clinical evidence. However, this does not justify the removal of tonsils in every patient any more than the teeth or other structures on which suspicion might be cast, or as a cureall for every disease in which they might be fancied to be the cause. It is needless to repeat that a careful and painstaking search of every other possible point of infection must have been made and these possibilities excluded. On examination

neither the size nor surface of the tonsils mean anything. There is an absolute lack of standards for a healthy tonsil. They may be small and with few visible crypts, and yet on pressure pus or foul débris may be exudated, or with a clean surface cultures from within the crypts may still show streptococci. In some cases it will be self-evident that the tonsils are the source of a metastatic infection. In other cases, *i.e.,* those diseases of obscure origin in which the subjective symptoms are few and where the tonsils show little, if any, evidence of abnormality, it is assumed that the help of an internist has been engaged and all other possible sources of infection eliminated. This obviously includes complete laboratory examination and the assistance of a competent neurologist, roentgenologist and dentist. Just as infected tonsils are the cause of so many systemic diseases, it is, of course, logical to expect to meet with ocular diseases from the same source. Among organic diseases of the eye, in which infection in the tonsils has been found to be the etiological factor, may be mentioned phylectenular conjunctivitis and keratitis, herpes of lids, conjunctiva and cornea, episcleritis, interstitial keratitis, iritis, iridocyclitis, corneal ulceration, choroiditis, retinitis and retinal detachment, hyalitis, optic and retrobulbar neuritis, embolism of the central artery, retinal hemorrhage, paralysis of accommodation and ocular muscles, panophthalmitis, periostitis, abscess of the orbit, and sympathetic ophthalmia. Through the work of Davis, Brown, Irons and others, it is now apparent that uveal tract inflammations are usually manifestations of systemic infection. It is also true that involvement of the optic nerve occurs in precisely the same manner, namely, from an infective agent in the blood.

The choosing of mesoblastic tissues by bacteria or their toxins, other than the uveal tracts of the eye, also includes involvement of the sclera, as in anterior scleritis. It is quite probable that the sclera, which, as stated before, is mesoblastic in origin and which is the outer protecting tunic of the eyeball, extending backward and forming from its innermost layers the cribriform plate at the disc, that involvement at this point would result in the optic neuritis or papilledema we find present on examination with the ophthalmoscope. This kind of optic neuritis is probably inflammatory in form, due to the local action of bacteria or their toxins and not mechanically, as from intracranial pressure, for lumbar puncture in some cases has shown no increased tension of the spinal fluid.

The following case of optic neuritis is of interest, first, because of the obscure etiology; second, because of retention of normal central vision with an inflammation of the nerve head present, but with permanent damage sustained by the nerve, shown in the contraction of the color fields, and third, because of the apparent non-participation of the tonsils and the quick relief obtained with removal of this remote point of infection.

Girl, 17 years of age, who was referred to me on July 5, 1918, by Dr. W. W. Cutter, with symptoms of "chlorosis," together with history of a slight pain and a "scum" or blur before the right eye. This eye symptom first appeared eighteen months previously, disappeared and returned two months ago. She thinks the eye condition now is much worse and that the vision in that eye is affected.

External examination of the eyes shows no abnormality, with vision in each eye normal. Pupils react to light, consensual, and to convergence. There is ciliary tenderness in both eyes. T. N. fields of left eye are normal. Those of right eye show slight form contraction to the temporal side, with marked contraction for all colors. Fundus examination of this eye reveals a swelling of the optic nerve of moderate degree completely covering the disc and extending outwards on all sides half a disc diameter. Macula and arteries show no changes. Veins are slightly larger. She has been under treatment with iron for some months, at this time without result. Her family history is negative; she is one of three children. This patient has never had tonsillitis, nor a single symptom, outside of her present condition, that could be referred to it.

She now suffers from constipation, has an acid stomach, much back ache, palpitation of the heart, fainting spells, and has a great deal of drowsiness, especially in the morning. She complains of a fullness in the head, which, together with weakness and lassitude, trouble her so much that she cannot get out of bed mornings. No nausea, vomiting, pain or headache. She weighs at this time 98 pounds. The tonsils appear very small, are submerged, and the visible crypts are clean. There are palpable submaxillary and cervical glands. Nose, nasal accessory sinuses and teeth are negative. Temperature normal. First sound of the heart is roughened. Blood pressure is 110-70. Examination of the blood shows hemoglobin 55, whites 8,000, reds 4,246,000. Urine, Wassermann and Von Pirquet are negative. Lead and alcohol intoxication can be ruled out.

Tonsillectomy done July 25, 1918, under ether anesthesia. The tonsils, of medium size, showed débris in the crypts. Immediate relief in her eye and general symptoms began, and also within a week there could be noted positive recession in the swelling of the nerve head. In three months the fundus examination showed an almost normal optic disc with the lamina in plain view. Nine months from the time of the tonsillectomy the fundus shows a normal disc, and to the nasal side there are two areas of retino-choroidal atrophy, one small, the other spot oval in form, about one and one-half disc diameters in size. The fields, however, for form and colors have not improved, remaining the same as at the first examination. Central vision remains normal. She has gained seven pounds in weight.

In this case the rapid recovery after removal of the source of the infection gives proof that the metastatic eye lesion was due to the infec-

tion in the pharyngeal tonsils. Relief of both the ophthalmic and general symptoms followed.

In the literature, five cases of optic neuritis and that of my own, from diseased tonsils, are all that have been reported. That it is more frequent is probable, but unless special attention is directed to these various foci and the source of the infection found, the discovery of the cause of the nerve involvement is not made. Assurance can be given that ocular complications from distant infections in the body have been and are frequent, but the connection between the infected point and the eye disease, until recently, has been overlooked. As will be seen, the neuritis can be unilateral or bilateral, and in some cases the disease is of sudden onset and destruction of vision can result very quickly. Therefore find, if possible, and eliminate, any distant diseased areas which may be the source of the inflammatory process in the optic nerves. In these cases, and in other ocular or general diseases of obscure origin, where the tonsils are the probable point of infection, tonsillectomy is justifiable. [Author's abstract.]

Brouwer, B. The Visual System in the Human Brain. [Nederland. Tijdschr. v. Geneeskunde, 1919, H 2, p. 891.]

Brouwer reports to the Amsterdam Neurological Society two cases of hemianopia in old women, one bilateral, the other unilateral, controlled by anatomical examination. In the case of bilateral hemianopia central vision was greatly reduced, but objects could be recognized: no mind-blindness. Death a year later. There was a focus in each occipital lobe. In the second case left hemianopia was due to a focus of softening in the medial part of the right occipital pole. In case one the focus in the right occipital lobe was almost entirely converted into a cyst extending into the ventricle. In the most occipital-wards third part of the calcarine zone this cyst included the whole central medullary field. On the left side the focus of softening included also the same field, at least in the hindmost third; this shows that the exact occipital pole cannot be connected with the 'tween-brain. On both sides these foci had spared the calcarine cortex but had interrupted the optic radiations; yet these were not entirely destroyed. In the left hemisphere there was a small, wholly dorsal, part, and also a wholly ventral part spared. But in the right only a part of the dorsal portion of the optic radiations was preserved. Especially the dorsal and the middle parts of the external geniculate bodies were degenerated. In case two the focus of softening was in the medio-ventral part of the right occipital lobe. The calcarine region was destroyed, except in its most frontal-wards parts; the focus had interrupted an important part of the optic radiations. Yet secondary degenerations are lacking towards the lateral part of the occipital lobe. The cells of the external geniculate body are almost everywhere entirely degenerated; only in its most frontal-wards part are these cells preserved. In the left hemisphere large foci are absent, but there are smaller ones

present; one of these is in the dorsal part of the optic radiation, and the resulting secondary degeneration can be followed through the whole brain to the external geniculate body in the dorsal part of the strata sagittalia. This sharply bounded focus has also given rise to sharply bounded cell-loss in the external geniculate body. Brouwer suggests that the macula-expansion takes up a larger part of the external geniculate body and the strata sagittalia than has hitherto been supposed, because the macula itself, so far as its nerve-fibers are concerned, forms a larger part of the retina than appears on a superficial view. The radiation of the macula on the human occipital cortex is fairly extensive. The expansion, however, is entirely on the calcarine zone. This theory helps us to understand the preservation—or only slight affection—of central vision in cortical hemianopia; for, if the expansion is a diffuse or extensive one, there is then a greater chance that central vision will be spared. That applies also to the fact that in double hemianopia central vision need be merely slightly diminished. Brouwer concludes that (1) in man the calcarine area of the occipital lobe alone forms the point of entry by which light-stimuli reach consciousness; (2) in man there is satisfactory ground for the theory that there is a positive anatomical projection in the various parts of the visual system with reference to one another, but not exactly as Henschen has indicated; and (3) that the radiation of the fibers for central vision on the occipital cortex is an extensive and diffuse one that ends within the calcarine area. [Leonard J. Kidd, London, England.]

Bauer, Julius. Pathology of Movements of the Pupil. [Deutsche Ztschr. f. Nervenh., Vol. LXI, p. 144.]

The author describes unilateral isolated reflex pupillary rigidity as the only symptom of a lesion of the oculomotor trunk. A review of the literature shows that the Argyll Robertson phenomenon may result from injury of the oculomotorius by skull wounds. In a case observed by the author of idiopathic hydrocephalus with choked discs there was nearly normal pupillary reaction. After an operation in the retrobulbar region of the orbita, however, an isolated reflex rigidity of the pupil on the side involved made its appearance, receding in course of time to a minimal reaction to light. No other cause for the pupillary disturbance could be assumed than the traumatic injury to the oculomotorius resulting from the operation. In reference to the localization of the cause of isolated reflex rigidity of pupils (Argyll Robertson phenomenon), the author discusses the various theories which seek to account for the manner in which the reflexes are destroyed, emphasizing the importance of the main point, *i.e.*, that a lesion of the oculomotorius may injure electively the iris fibers of this nerve trunk in such a way that the isolated reflex pupillary rigidity, or the Argyll Robertson, results. It would then be inconsequent if, in cases of Argyll Robertson in syphilis and metalues, a wholly different pathogenesis for the pupillary rigidity were assumed

than that which is known to cause the phenomena where the injury is certainly located in the oculomotorius. In the majority of cases of bilateral Argyll Robertson a more or less extensive degeneration of the oculomotorius which proceeds electively and insidiously may be assumed. The author further describes a rare instance where a lesion of the oculomotorius had conditioned in the sphincter pupillae (which did not react to light at all and only slightly in convergence and accommodation), a movement in the sense that whenever the patient attempted to look upward there was a sudden narrowing of the pupils without any other response to the impulse. In concluding the author describes a perverse pupillary reaction: in a man with a metaluetic disease the reaction to light but not to convergence on the right side was destroyed, while on the right the pupil, rigid to light, dilated when an effort at convergence and accommodation was made, and narrowed when the attempt was made to fix the glance at a distance. [J.]

Brouwer, B. Unilateral Non-luetic Argyll Robertson Pupil. [Nederland. Tijdschr. v. Geneeskunde, 1918, H i, p. 1277.]

Brouwer reports to the Amsterdam Neurological Society the case of an unmarried seamstress, 19, who came for pain in eyes and general nervousness. Anisocoria; left pupil the larger; reacted well to convergence but not at all to light. Right pupil reacted to light, but not quite briskly, and well to convergence. Normal accommodation. Slight thyroid enlargement. No neurological signs, except that left ankle-jerk needed reinforcement, and the right was on the minus side. Lues was denied. Diagnosis was lues of central nervous system, or possibly incipient tabes. Wassermann negative in blood and spinal fluid; negative Nonne reaction; no pleocytosis. On some occasions the left ankle-jerk could not be obtained. A fortnight later the knee-jerks were greatly exaggerated. Inquiry from an ophthalmologist showed that five years previously patient had a total left internal ophthalmoplegia, without synechiæ. The family history did not suggest congenital syphilis, and the mother showed no neurological signs. The patient had no signs suggestive of disseminated sclerosis (the A. R. pupil does sometimes occur in that disease), and there was no evidence of any skull injury. [Leonard J. Kidd, London, England.]

Barral, F., and Ranc, A. The Chemistry of Taste. [Journal de Psychologie, 1920, Jan., Vol. XVII, p. 16.]

So far as the author knows G. Cohn is the only writer who has hitherto devoted any considerable attention to the relation of chemistry to taste, and for this reason he believes his own collection of data on the subject may be of interest. It is from the molecular architecture of bodies that all those properties proceed which are the objects of scientific study, depending (1) on the chemical composition of the substances, (2) on the mutual relations of the atoms, (3) on the stereochemical con-

figuration. In relation to taste these factors are of unequal value, the chemical constitution, represented more or less accurately in the symbolic formulae, being the property on which the gustatory quality principally depends; analogy of constitution bringing with it similarity of taste. The author gives specific gustatory qualities resulting from definite combinations, among others the following examples: For the most part, a radical introduced into a sweet molecule destroys that taste and calls forth a bitter one. The modification is more clearly defined in proportion to the greater specific gravity of the radical. Nitration destroys the sweet taste, as does also the formation of most halogen derivatives. The influence of an alcohol radical is more complex; action of alcohol elements on an amidin group gives rise to a sweet taste; action of such elements on an imidin group or a hydroxyl causes a sweet taste to disappear. Sulphonation of a group seems to have a tendency to cause a bitter taste. Acting in a different way, a methoxyl introduced into an aromatic molecule gives rise to a sweet taste. Though certain general rules may be thus formed from this array of facts, it is impossible, in the light of our present knowledge, to infer with precision from the structure of substances the elementary taste which will result from their action on the gustatory nerves. New qualities are called forth by the mere juxtaposition of certain molecules. In studying colors and sounds knowledge of the unvarying interaction of the physical vibrations permit generalizations, but for taste the conditions are less simple. There is immediate contact between the substance and the sensory apparatus, and that action at close range hampers the analysis of the procedure. The quality of taste in objects is not a measurable quality because we possess no definite representation of chemical combinations as we do of the interaction of vibrations of light and sound. [J.]

Vernet, M. Paralysis of the Vagus Nerve. [Med. Rev. of Reviews, 1919, XXV, June, p. 330.]

Vernet's recent clinical observations and sections of wounds affecting the vagus nerve have thrown fresh light on certain points in its physiology. Clinically, he has seen the following: (1) Cases of hemianesthesia or of hemihyperesthesia of the soft palate, pharynx, and larynx (a) without sensory changes in the trigeminal distribution, (b) without paralysis of the glossopharyngeal nerve (paralysis of the superior constrictor [Vernet] or gustatory disorders); (2) cases of glossopharyngeal paralysis with profound alteration of the sense of taste without concomitant sensory disturbances of the soft palate or pharynx of the same side. In cases of paralysis of the last four cranial nerves (9 to 12)—in which the trigeminus nerve is not involved—he has found that the zone of hemianesthesia or of hemihyperesthesia of the soft palate extends over the soft part of the velum only (at the level of the arc between the uvula and the faucial pillars) without in any way affecting the mucous membrane of the palatine arch. Unilateral injury to the sensory nerves

of the soft palate, pharynx, and larynx arise from a corresponding injury to the vagus nerve in its peripheral course. These sensory disorders may be accompanied by certain symptoms which may throw light on the localization of the lesion. Vernet groups these symptoms under five headings: (1) The state of the auricular branch of the vagus. Escat's "sign of the tragus" or hyperesthesia of this branch signifies irritation of the vagus; in some patients it is so marked that cough is produced by simple pressure on the hinder wall of the external meatus of the injured side. In a paralysis of the vagus, revealed by a hemianesthesia or by a palato-pharyngo-laryngeal hemihyperesthesia, there is present also anesthesia of the auricular branch of the vagus of the same side; the limits of the zone of anesthesia can be accurately determined by exploring with a pin both the healthy and the paralyzed side. (2) Pain. This may be spontaneous or induced. It is felt on the paralyzed side. Spontaneous pain is felt as a painful feeling of tickling or constriction. Pain can be induced by pressure on the wing of the thyroid cartilage on the injured side. Vernet has found it in every case of vagus irritation. He claims that there is a true neuralgia of the vagus, characterized by subjective and objective sensory signs at the level of the soft palate, pharynx, and larynx. He cites a case of severe pharyngeal pain cured by surgical division of the pharyngeal branch of the vagus or the vagus itself. (3) Cough. This is one of the most constant symptoms of vagus irritation; it occurs as a coughing fit simulating pertussis (Escat); it may be spontaneous or induced. It may be induced by pressure on the front of the sternomastoid behind the angle of the jaw on the paralyzed side. (4) Respiratory disorders, (a) the exertion-dyspnœa, (b) the pseudo-asthmatic. The exertion-tachypnœa depends on a hyperexcitability or irritation of the vagus. In wounds of the cervical vagus this symptom is present as long as the hyperesthesia persists. It is brought on by any slight exertion. The pseudo-asthmatic type of dyspnœa is a frequent accompaniment of destructive lesions of the vagus. The patients usually complain of a slight dyspnœa, chiefly nocturnal; they may have to sit up, or may be suddenly wakened by this symptom when lying on the uninjured side. Vernet holds we must regard these disturbances as reflex, and must consider the vagus as the sensory nerve of the lung, and the spinal accessory as the broncho-pulmonary motor nerve. (5) Disturbances of salivation. In nearly all of the war-wounded cases Vernet has seen he has noted some salivary disorders, at least during the first few days after the injury; hypersecretion of saliva indicates vagus irritation, deficiency of secretion, vagus palsy. He holds that the vagus takes no part in the motor innervation of the palato-pharyngo-laryngeal muscles, the motor innervation being supplied by the internal branch of the spinal accessory; and that the vagus must be regarded as a sensory nerve only, even the cardio-moderator fibers being branches of the internal branch of the spinal accessory nerve. [Leonard J. Kidd.]

Klein. Rhythmic Spasms of the Soft Palate and the Swallowing Musculature. [Monatsschr. f. Psychiat. u. Neurol., Vol. XLIII, p. 79.]

There is much obscurity concerning the pathology of continuous rhythmic twitching of the swallowing musculature. For the production of this disturbance four causes may be taken into consideration: (1) Direct irritation of the motor nerves. (2) A reflex mechanism. (3) An hysterical foundation. (4) An organic disease of the central nervous system. The occurrence of these spasms as result of a disease of the motor nerves cannot be regarded as conclusively proved. There is no doubt, however, that they occur on a reflex basis, and they are explained by the following mechanism: The sharply bent course of the tensor around the hamulus pterygoideus favors a passive tension of the muscle when there is a certain contraction of the antagonists so that the tensor is specially inclined to a reflex clonus. The untiring constancy of the twitching is thus also accounted for. The rhythmic spasms may jump over to the other palatine muscles or to the other side. From this disturbance must be differentiated the continuous rhythmic spasms involving electively the entire swallowing apparatus, which also may take place reflexly, but in connection with a supra-nuclear swallowing center. The reflex tensor or soft palate spasm may also take place on an hysterical basis, in the sense that from a psychogenic source, with general heightened reflex excitability, a state of tension arises which is favorable for the production of the reflex twitching. The occurrence of continuous rhythmic cramps affecting the entire swallowing musculature on an hysterical basis has never yet been described. The few cases of spasms of this sort in organic disease which are to be found in the literature were only inadequately observed. The author describes three cases from his own experience where continuous rhythmic spasms of the swallowing apparatus were the permanent symptoms left from apoplectic seizures. In all three cases were found at the autopsy apoplectic cysts situated in nearly the same places in the cerebellum, namely, in the region of the nucleus dentatus. In two cases the cysts were on the homolateral side with the spasms, and in one case of bilateral spasms the cysts were on both sides. In all three cases there were also synchronous twitchings in other muscle regions; in the first case of the levator palpebrae, in the second case in the intercostal muscles, and in the third in the orbicularis oculi. It may therefore be assumed that continuous rhythmic spasms are produced in very different muscle regions in diseases of the cerebellum, and that therefore there are in this organ distinct localizations. [J.]

Laurens, P. Associated Laryngeal Palsies from Injury to the Four Hindmost Cranial Nerves. [Rev. de Laryng., Otol., et Rhinol., 1919, Nov. 30, p. 624.]

A case of the so-called "syndrome of the posterior lacerated foramen." A shell-fragment entered the right molar region of a soldier and lodged

below the base of the skull in front of the anterior part of the atlas to the right of the middle line, as shown by radiography. There was palsy of the right ninth, tenth, eleventh, and twelfth cranial nerves, shown by difficulty in swallowing solids; paralysis of the right half of the constrictor superior pharyngis (Vernet's "curtain movement," *i.e.*, elevation of the sound side of the pharynx during phonation, due to the unantagonized action of the normal left half of the superior constrictor); agensia of right hinder third of tongue; hemianesthesia of right velum palati, palate, and larynx; salivary hypersecretion which gradually disappeared; cough on swallowing; dyspnœa with slowed respiration; palsy of right velum palati; palsy of right half of larynx with vocal cord in cadaveric position; acceleration of pulse; palsy of right sternomastoid and trapezius which rapidly atrophied; and by palsy of right half of tongue, with slight atrophy. The cervical sympathetic escaped injury. [Leonard J. Kidd, London, England.]

Lannois and Molinié. Paralysis of the Four Hindmost Cranial Nerves Following Operation for Acute Mastoiditis. [Lyon Médical, 1919, CXXVIII, April, p. 193.]

The writers reported to the Medico-Chirurgico-Military Society of the 14th region on July 27, 1918, a case of paralysis of the ninth, tenth, eleventh, and twelfth cranial nerves which occurred rapidly three weeks after operation for acute mastoiditis. Many of the cases of this "syndrome of the posterior lacerated foramen" of Vernet have been caused by injury by a bullet to these four nerves at their exit from the cranial cavity. In the case of Lannois and Molinié the paralytic symptoms began abruptly with aphonia, a sense of discomfort in the tongue, difficulty in swallowing, and regurgitation of liquids and solids by the nose, but without fever. There was now no otorrhœa, and hearing had partly returned. There was left hypoglossal palsy, atrophy of left half of tongue, left palatal palsy, slight paresis of superior constrictor of pharynx with turning of posterior pharyngeal wall to right, paralysis of left vocal cord, paralysis of left sternomastoid and trapezius with atrophy. There was slight slowness of perception of taste for sweet on left half of tongue. Pulse 120, heart normal. No sensory changes in superior laryngeal nerve area of distribution. Absence of any other symptoms. [Leonard J. Kidd.]

3. SPINAL CORD.

Bersot, Henri. New Study of the Plantar Reflex. [Schweizer Archiv f. Neurol. u. Psychiat., 1919, Vol. V, No. 2, p. 305, and 1920, Vol. VI, No. 1, p. 37.]

The author proposes a modification of the "plus-minus" method used by Lipps for comparing the augmentation and diminution of frequency with which, at different ages and in different conditions of health and

disease, the various reflexes occur in relation to each other and to the general heightening or reduction of reflex excitability of the individual. Certain norms or average values are ascertained for the behavior of reflexes under various conditions, and the author has constructed tables of these values which may be regarded as representative syndromes for different ages and conditions; that is, they show what combinations are likely to be encountered, for example, in hemiplegia, general paresis, etc. All these reflexes are interdependent, yet in various conditions some are augmented in activity, others are diminished or tend to disappear; there is a constant evolution and transposition, which it would be difficult to follow without quantitative data. Of all the reflexes, that of the great toe is the one which shows the greatest constancy in connection with certain ages and conditions, the greatest difference in frequency marking differences in physical condition, and the greatest variation in opposite directions in normal and pathological conditions. Not only has each one of these normal and pathological reactions a character peculiar to itself, but each reaction is distinguished also by its correlation with the total reflex excitability of the individual or with the other separate reactions. We see, for example, that in pathological conditions, when the whole reflex excitability of the individual is augmented, the contractions of the tensor muscles of the fascia lata, the quadriceps and the adductors tend to diminish in frequency; while in normal persons all the reactions vary in the same sense as the general reflex excitability. The extent of the region which reacts to the plantar simulation tends to become limited in pathological subjects, while in normal ones it tends to increase in direct proportion with the heightening of the total reflex excitability. All the reflexes which are encountered in pathological conditions may also be encountered in normal conditions, so that it is not the mere presence or absence of a reflex (for example, of the great toe) which is of diagnostic importance, but its variation in reference to other reactions or to the whole reflex excitability of the organism; the relative frequencies constitute the characteristic symptoms of diseases. [J.]

Quercy, P. The Sensory Roots May Reach the Posterior Cord Through the Lateral Cord and the Posterior Horn. [L'Encephale, 1920, January, Vol. XV, p. 13.]

The author describes a noteworthy exception to the general experience, verified in countless instances, that the sensory roots enter the medulla by way of the posterior column. It was found at the autopsy of a case of lateral sclerosis and syringomyelia that sensory radicular fibers entered the medulla by way of the lateral column, passing in front of the posterior horn, perforating it at the level of its base and arriving by that detour at the posterior column, where it terminated regularly. In answer to the question whether this unusual finding may be considered normal, the author calls attention to the fact that in the embryo the posterior roots reach the medulla through the lateral column, though

they do not traverse the same course as in the case he describes. He finds explanation of the course taken by the fibers in the fact that the path traversed was the one of least resistance leading to the normal termination in the nucleus of Burdach, toward which the fibers tended as though drawn by an irresistible attraction. The author's discovery thus shows that the posterior roots may penetrate to the medulla at a point different from their usual point of entry. Traversing the direct and pyramidal cerebellar bundles of the area of Rolando and reaching the base of the posterior horn, they may then curve back and attaining to the normal point of termination for the radicular sensory fibers, there bifurcate. The sensory roots in the embryo commence by being lateral, they remain lateral in fishes, they divide into lateral and posterior roots in reptiles. There are then in comparative anatomy and biology numerous facts which have similarity with this anomaly and permit its origin to be understood. This instance shows with what energy the nervous fibers which have strayed from their usual path tend to arrive at their normal point of junction with the central nervous system. [J.]

Brown, T. Graham, and Stewart, R. M. Observations on Reflex Phenomena in Cases of Spinal Injury in Man. [Rev. of Neur. and Psych., 1918.]

This is a contribution from the Neurological Department, British Salonica Force. After an introduction on the characters of the flexion-reflex, the subject is treated in a conclusive way under the sub-titles: The Receptive Field in Man; the Effective Field; the Reflex Reaction—Immediate Reflex Phenomena; "Reflex" Reversal in Immediate Reflex Phenomena; "Rebound" Phenomena (Successive Reflex Phenomena); Compound Reflex Phenomena; Rhythmic Phenomena, and the Diagnostic Value of Rhythmic Reactions. The article is best read in its entirety. The authors' conclusions state: "In this paper we have given an account of reflex phenomena encountered in man. The greater part of these have been observed previously in other mammals under experimental conditions. Many of them are described here for the first time as they occur in man. This does not, however, mean that they are of rare occurrence in the human subject, but only that they have probably not been systematically sought before. A few of these observations would seem to be novel. One is perhaps of diagnostic significance. We think, however, that the phenomena which we have described are of chief interest in that they show that the limb reflexes of man are strictly comparable in their various characteristics with the limb reflexes of other vertebrates. Indeed, apart from the phenomena which can only be seen when the movements of isolated muscles are graphically recorded, almost all the characteristics and variations of the vertebrate limb reflex have been observed by us in man." The observation alluded to as of diagnostic significance is in reference to the presence of rhythmic alternate movements of the lower limbs in response to stimuli which are applied either

to one lower limb alone or to both lower limbs simultaneously. The site of the lesion in the cases in which it was observed, and in which definite evidence was obtained, was the sixth, seventh, or eighth thoracic spinal segment. The occurrence of this phenomenon, in their judgment, would seem also to point to a complete compression or division of the spinal cord in that region.

Jonkhoff, D. J. The Prognostic Importance of the Magnus-de Kleijn Neck Reflexes in Man. [Nederl. Tijdschr. v. Geneeskunde, 1920, LXIV, p. 307 (1 Fig.).]

In 1912 Magnus and de Kleijn described certain neck reflexes (and also labyrinthine reflexes) in decerebrated cats (Pflüger's Arch. für Physiol., 1912, CXLV, p. 455). Apparently only eight cases have been recorded in man. Jonkhoff's case was a girl of 17 who had had epileptic attacks for four years, which were controlled by regular use of luminal till just before admission. She went into status epilepticus four days before admission; her father observed sixty major attacks. Apart from the convulsions she was almost entirely unconscious, did not speak, and passed urine involuntarily. Her attacks were preponderantly right-sided. Bilateral Babinski sign. Under oral and rectal sedatives the attacks lessened, and she slept well. Luminal resumed, but status returned in three days, with severe bilateral convulsions lasting all day. The head is held mainly to right, eyes strongly to right, the right arm shows a strong extensor tonus, the left is held always in a flexed posture. Spine curved, with concavity to right; legs extended and hypertonic. All other reflexes very feeble. No other signs; temperature 37° to 38° C.

When the dextro-deviated head was turned to the left, the powerful extension of the right arm disappeared; so also did the flexion of the left arm. The influence of the neck reflexes on the eyes, described by de Kleijn, was here but slight; yet, on turning the head to the left, the deviation of the eyes to the right disappeared. On one occasion a slight effect of the neck reflexes was noted in the lower limbs. These neck reflexes (clearly the Magnus-de Kleijn reflexes) were seen especially during the waking from coma, or after the convulsions; whenever consciousness was a little clearer they were absent or feeble. The patient died unexpectedly nine days after admission. Necropsy: Effusion of blood over the whole pallium; on section of brain, hemorrhage over gyri centrales especially, and a right ventricular hemorrhage. This great destruction of brain tissue explains the presence of the neck reflexes; there was, in fact, a partial decerebration. Jonkhoff points out that in his case a favorable prognosis, as to life, was held for four years. He holds that the presence of these neck reflexes proves the existence of a serious anatomical lesion, and is of the gravest prognostic omen. [Of the five human cases cited by Magnus and de Kleijn, two were hydrocephalus, probably secondary to tumor cerebri and cerebelli, respectively;

one was apoplexy, with bursting of blood into all the ventricles and between cerebrum and cerebellum; the fourth showed symmetrical hemorrhages in the lenticular nuclei, following artificial labor; and the fifth was one of purulent meningitis. Brouwer has recorded a case, with a searching microscopical examination, occurring in a child during the last few days of its attack of meningo-encephalitis (Zeitschr. für die ges. Neurol. und Psychiat., 1917, XXXVI, p. 161 [16 Figs.].).] [Leonard J. Kidd, London, England.]

Trias, J. Spastic Paraplegia, Following Exploratory Laminectomy. [Compt. Rend. Soc. de Biol., 1919, LXXXII, July 12, p. 826.]

Trias records the case of a boy of 18 who seventeen months ago had an attack of what was probably meningitis; this was followed by a chronic spastic paraplegia with exaggerated knee-jerks, ankle clonus, and bilateral Babinski and Oppenheim signs. There was abolition of superficial tactile sensibility (brush) and of pain-sensibility (prick), preservation of deep sensibility, and delayed thermal sensibility. A tumor of the spinal cord was diagnosed, and laminectomy was performed over the eighth, ninth, tenth, and eleventh dorsal spines. The dura was adherent to the spinal cord and there was closure of the arachnoid and the subarachnoid space by adhesions. After destruction of the adhesions the cerebrospinal fluid escaped, the cord being dry in this region. On the next day the spasticity and the pathological reflexes disappeared, tactile and pain-sensibility reappeared, and the patient had pains due to irritation of the thoracic dorsal-roots. Twenty days later there were slight movements of the toes. The case illustrates the fact that many cases of meningomyelitis which have resisted medical treatment can be benefited at once by surgical destruction of the fibrous bands that are compressing the cord. By this means we may prevent the occurrence of irreparable degenerative lesions. [Leonard J. Kidd.]

Doche. Tuberculosis of the Spine (Pott's Disease) in Adults. [La Presse Médicale, No. 4, January, 1920.]

The author summarizes as follows conclusions derived from a study of 140 cases of tuberculosis of the spine (7 cervical, 31 dorsal, 102 lumbar, dorso-lumbar, lumbo-sacral) by him observed among French or allied soldiers, all belonging to the white race:

1. The *pain induced by pressure or succussion* of the spinous apophysis of the vertebrae *is not* a constant symptom, particularly in the dorsal (it is missing in one third) and in the lumbar localization of the disease (it is missing in about one fourth of the cases).

2. Of much importance for the early diagnosis of the tuberculosis of the spine in adults are the *spontaneous sensitive troubles*, which may occur in form of localized or radiating pains, and are an almost constant sign; in 140 cases these spontaneous pains failed only 12 times. Charcot and Launebougue had especially insisted upon the fact that the tuberculosis of the spine may reveal itself by painful phenomena of neuralgic

type before showing some spinal sign. The neurologists know perfectly well that these pains, which occur critically, which are often bilateral, not limited to a single region of nervous distribution, and which show, in a word, a radicular character, must draw the observer's attention upon the spine; nevertheless, very often these pains have been looked upon and treated as the most different neuralgias (viz., torticolis, cervical, brachial, intercostal, crural or sciatic neuralgia; gastralgy; liver or kidney's colic; lumbago).

3. In adults the *gibbosity* appears much later than in children; on the contrary, very frequent to be observed are the *lateral deviations of scoliotic type* of the spine.

4. Among all the early symptoms of the tuberculosis of the spine in adults the most constant and prominent feature is the *limitation of movement* due to contracture, and it is especially the *movement of hyperextension,* which is *always and completely hindered.*

5. Among complications, the *abscess,* generally, is uncommon in the cervical localizations (1: 7), but it is quite frequent (79:102), on the other hand, in the lumbar, dorso-lumbar and lumbo-sacral cases.

Treatment.—The treatment adopted by the author is total heliotherapy, carried out progressively according to Rollier's method; the patients are exposed to the sun, in the open air, and on the sea-shore. The principal contraindication of the sunlight treatment seems to be the fever of purely bacillary source; the fever which, in the cases with fistules, occurs as a consequence of an associated infection, is favorably influenced by heliotherapy; and, if associated, the pulmonary tuberculosis itself seems not to be a contraindication; on the contrary, the sunlight treatment is absolutely contraindicated in the congestive or caseous lesions and in all the cases evolving with fever.

All patients are kept in the recumbent position (for at least six-eight months after all clinical signs have disappeared) and are submitted to a strict immobilization, obtained by means of a two-valved plastered chest-abdominal bandage, which not only controls a perfect immobilization when tied up, but, at the same time, by removal of respectively the anterior or posterior valve, allows the total insolation and prevents the muscular atrophy and the maceration of the skin. The abscesses are punctured according to the usual methods. As regards the fistules, the deep drainage and the disinfection of the tracts with Dakin's fluid improve immensely the successful results of the helio-marine treatment.

Results.—The closed and unassociated cases of tuberculosis of the spine that have been treated by the author are now completely recovered or are recovering; on the other hand, the cases with tuberculous generalization or with infected fistules have shown a very high mortality, but, of course, it has to be considered that all such kinds of patients were in a condition of advanced and deep cachexia, with albumin in their urines, and worn out with physical strain due to the war; most of them had been previously wounded or were suffering with malaria.

Conclusions.—The sunlight treatment, carried out on the sea-shore, supplemented by immobilization, gives good and constant results in the tuberculosis of the spine, provided there is not a severe tuberculous association or an infected fistule; therefore, the author likes to emphasize the points that always are to be kept in mind—the dangers of the spontaneous or operative fistulization of the ossivorous abscesses of the spine. [Author's abstract.]

Mayer, William. Traumatic Pseudotabes. [Journal f. Psychologie u. Neurol., 1920, Vol. XXV, p. 170.]

The author describes the further observation of a case published by him in 1913—that of a patient struck by lightning. There were no external wounds and the symptoms resembled those of a luetic or metaluetic disease. Disease of syphilitic origin could be certainly excluded, however, on anamnestic, serological and clinical grounds. The diagnosis of traumatic pseudotabes was made. At the present examination a new combination of symptoms was presented, in the foreground of which stood pupillary disturbances (rigidity of pupils to light and myatonic reactions), disturbances of sensibility, absence of patellar and Achilles reflexes, and serious general psychic deterioration—a combination which could to some extent be explained by the assumption of a meningitis serosa traumatica. Similar cases have been described by Roemheld, who used the designation of traumatic pseudotabes after gunshot wounds and believed the pathologico-anatomical picture would correspond to that of a meningitis serosa expressed principally in a hypersecretion and strong increase of pressure in the cerebral spinal canal, together with diffuse injury of the nerve tissue and vessel changes in the brain. Loss of patellar and Achilles reflex he explains as due to primary medullary injuries or degenerations in the posterior column and roots as consequence of prolonged pressure. In the opinion of the author there seems to be, beside the meningitis, diffuse minute cerebral lesions, but the symptomatology is sufficiently similar in all these cases to justify placing them under a classification of pseudotabes after brain trauma with psychic changes in the sense of brain weakness. [J.]

Brouwer, B. A Case of Brown-Séquard Paralysis. [Nederland. Tijdschr. v. Geneeskunde, 1916, LX, 1979 (2 Figs.).]

Brouwer reports to the Amsterdam Neurological Society a case of Brown-Séquard paralysis due to a tubercle in the first cervical spinal cord segment. A shoemaker, forty, had pain in left neck eighteen months previously, and weakness in left arm and leg. At first the pain was not severe, but it slowly increased and radiated towards the occiput and left shoulder. A few months later his left hand became less useful; this increased, and he felt a dull feeling in his right arm and leg. Then weakness of left leg and some difficulty in walking. No bladder or rectal symptoms; no vertigo; no speech nor psychical symptoms. Good per-

sonal history; no lues; an aunt insane; mother and sisters tuberculous. Examination shows slightly narrowed left palpebral fissure; left pupil the smaller; good reactions both eyes. No nystagmus nor ocular palsies. Deaf since early life; no other cranial nerve affections; no amytrophies. Left arm, hand and leg weak; right normal. Tactile sensibility almost normal everywhere to cotton-wool, and localization good; but he says that wool-stroking over right arm, trunk and leg is duller than on left. He recognizes two points of compass well. Pain sensibility is disturbed; he distinguishes the head of a pin from the point, but is analgesic over the skin of the right half of the body. Thermal sensibility also affected on right; cannot tell hot from cold, and has previously often burnt right hand and foot on the stove. In the left neck there is a small area of thermal disturbance; on the right side this reaches the boundary line between C_2 and the trigeminus area; on the left it includes part of the trigeminus area. Muscle-joint sense normal. Left arm reflexes plus, with thigh and foot clonus; left abdominal reflex absent; right sluggish. Left Babinski and Mendel-Bechterew, right Strümpell. No ataxy; rigidity in left arm and leg. The right limbs are cyanotic and always feel cold. Cervical spinal column normal. Negative Wassermann blood. Positive von Pirquet reaction. Lumbar puncture was not done, owing to the danger from a lesion of the upper cervical cord. In this case diagnosis lay between a tumor and syringomyelia. An extra-medullary lesion is well-nigh excluded by the sensory dissociation in the left half of the neck, viz., severe disturbance of pain- and temperature-sensibility, with merely subjective tactile-sensibility change. Syringomyelia is improbable, for it attacks the gray matter first, and only later invades the white, whereas in the patient the latter is predominantly affected. The diagnosis is a tubercle in the first cervical segment, as is suggested by the tuberculous taint and the patient's positive von Pirquet reaction. As to operation, Brouwer mentions the successful removal of a tubercle of the upper cervical cord by Veraguth and Brun; but in their later cases operation was followed by diffuse tuberculosis of the bulb. As the patient's condition is fairly good, and as encapsulation of the tubercle is possible, Brouwer prefers to wait provisionally. (In the discussion on Brouwer's paper Klessens referred to the danger of operation in these high cervical or cervico-bulbar cases, not only because of proximity of vital centers, but also because of the risk of the production of air-emboli. He had found that air-emboli often occurred in cats after operation in the region of the first and second cervical segments.) [Leonard J. Kidd, London, England.]

Neuhof. Spinal Cord Tumor. [Annals of Surgery, 1920, LXXI, May, p. 675.]

Neuhof reports to the New York Surgical Society a spinal cord tumor in a man, forty-seven, who had had for some eight years pain about his left shoulder which he took for rheumatism. In November,

1918, lancinating pains in third, fourth, and fifth fingers of left hand; later, similar pains down left lower limb. Then difficulty and stiffness in walking, with dragging of left leg; later, urinary difficulty. All symptoms were progressive, especially the pain radiating into left hand. Examination: left pupil the smaller; both upper limbs atrophic, but chiefly left hand; spastic gait, with plus and abnormal reflexes, and ankle and patellar clonus. Upper level of hyperalgesia vague, indefinite, and variable, from upper cervical to upper dorsal segments. Yellow fluid on lumbar puncture, so operation was performed. The spines and arches of the third to seventh spines were removed; on opening dura, a cystic portion of the tumor presented. The whole tumor was eventually slipped free; it arose from the pia-arachnoid. The cord was much flattened, more on left. The tumor measured 8 c.m. long by 2½ in. diameter; it showed a number of cystic excrescences, and for the rest was of jelly-like consistency; the cysts contained clear or bloody fluid. The tumor was an endothelioma with cystic and hemorrhagic degeneration. There has been good recovery, freedom from pain so far, and gradual improvement in motor power of left arm and hand; right upper limb virtually normal; much less spasticity of lower limb; normal urination. The relatively slight manifestations of this large tumor depended on its semi-fluid consistency. [Leonard J. Kidd, London, England.]

Deteyssieu, Molin. Syringomyelia of Unilateral Localization. [Journ. de Méd. de Bordeaux, 1919, XC, p. 206.]

The writer showed on April 4, 1919, to the Society of Medicine and Surgery of Bordeaux, a woman, aged fifty, who had mutilating painless whitlows of insidious evolution. There was the Aran-Duchenne type of muscular atrophy of the hypothenar muscles and the interossei of the right hand, marked paresis of extensors of the wrist, and a slight retraction of the palmar aponeurosis on the ulnar side. There was loss of thermal and pain-sensibility in the palm, and hyperesthesia of segmental type extending to three centimeters above the wrist. The right elbow shows a rather large arthropathy which gave the patient no inconvenience. There is a rather marked hypho-scoliosis with convexity to the right. Abolition of right arm-jerks. Bilateral exaggeration of knee-jerks. Bilateral ankle clonus and Babinski's sign. No bulbar or cerebellar symptoms. The writer thinks that these symptoms are due to a glioma localized between the fifth and the eighth cervical segments, occupying the antero-lateral tract and a large part of the ventral horn, compressing the direct and the crossed pyramidal tracts of the same side. As these symptoms appeared four years ago, during the months which followed a successful surgical treatment of a diffuse phlegmon of the hand, the hypothesis is offered that there may have been an ascending involvement of the spinal cord. [Leonard J. Kidd.]

Hassin, G. B. A Contribution to the Histopathology and Histogenesis of Myelia. [Am. Archives of Neurology and Psychiatry, III:130, 1920.]

The histopathologic study of a case of syringomyelia with the modern methods leads the author to the conclusion that syringomyelia is a typical morbid entity, contrary to the prevailing opinion that it may be caused by a broken-down tumor, a broken-down proliferated glia (gliosis), a hematomyelia, hydromyelia, or pachymeningitis. The characteristic histologic features are not so much cavity formations as a growth of deficient glia which ultimately leads to formation of so-called zones or areas of "homogenization." The latter, stained with Bielschowsky's silver method or a combined Bielschowsky-Alzheimer-Mann stain, was found to consist of practically normal nerve fibers with well-preserved myelin and axons, while the glia, in the "homogenization" zone, was represented by so-called glia nuclei, protoplasmic glia cells containing an eccentric pycnotic nucleus, some amyloid bodies and numerous globules of broken-up glia fibers. There were few gitter cells packed with fat globules. These "homogenization" areas were enveloped by a strong connective tissue membrane whose origin could be traced to the thickened and hyperplastic pia. In addition to the foregoing zones there are areas less destroyed, represented by a friable tissue consisting of a broken-down glia and retained axons and myelin. Such areas also were surrounded by a connective tissue membrane forming so-called "encapsulations" of Petrén. They are very numerous near the cavities and those places which ultimately become "homogenized" and transformed into cavities. The encapsulations contain a great number of well-developed vessels with thickened and hyperplastic adventitia, frequently forming so-called vascular "aggregations" or "pockets" of vessels surrounded by a common capsule. Such vascular formations are known as "vascular stands" of Petrén. Like the pia, the hyperplastic adventitia must be looked upon as a secondary process obtaining as the result of the destroyed parenchyma or due to the increased pressure within the central canal. The latter was not communicated with the cavities or the "homogeneous" zones, and was surrounded by a fine glia reticulum. The conclusions from this study are that syringomyelia is essentially a disease of the glia, not of the nerve tissue, being an inborn developmental anomaly of the glia tissue, analogous to the inborn weakness of the nerve or muscle elements as seen in progressive muscular atrophies or distrophies. The contribution is accompanied by eight photomicrographs and one colored picture showing the advantages of the combined Bielschowsky-Alzheimer-Mann stain. [Author's abstract.]

Schreiber, Alfred. Variety of Forms of Multiple Sclerosis. [Deutsche Ztschr. f. Nervenh., Vol. LXI, p. 341.]

The great advances which have been made in the knowledge of multiple sclerosis have led to a discovery of an astonishing number of

forms which the disease may assume. It may be said without exaggeration that there is scarcely a disease of the brain or medulla oblongata which multiple sclerosis may not simulate. The author describes a number of cases which fell under his observation. In one case there was reflex rigidity of pupils—a symptom usually associated only with syphilitic diseases of the brain and medulla. It was the only case with this symptom observed among 330 which the author examined in the course of ten years. In another case the symptoms were those of a disease of the posterior column, and only as the sclerosis advanced could the true diagnosis be made. In a third case a differential diagnosis had to be made from a tumor of the medulla oblongata by an exploratory operation which resulted in a negative finding. In another case there was a transverse injury of the medulla oblongata at a high level. In this case the author encountered difficulty in differentiating the disease from hysteria. The author remarks that in its initial stages multiple sclerosis is often confused with hysteria. [J.]

Steiner, G. On Experimental Disseminated Sclerosis. [Neurol. Zntrbl. 1919, No. 22, p. 727.]

A communication made at the 44 "Wanderversammlung" of the Neurologists and Psychiatrists of South-west Germany, held in Baden-Baden on May 31 and June 1, 1919. Steiner gave a preliminary account of the histo-pathological changes observed in the central nervous system of a monkey (Macacus rhoesus) which in March, 1917, had been injected by him and Kuhn with 1 c.c. of cerebrospinal fluid from a recent case of disseminated sclerosis. In February, 1918, viz., almost one year afterwards, the monkey showed some signs of paralysis, from which it very soon recovered. But in June, 1918, a spastic form of paralysis of the hind limbs made its appearance and lasted unmodified till July of the same year when the animal was killed. The post-mortem examination showed the existence of a great number of foci unsystematically disseminated in the white substance of both cerebral hemispheres. The foci were investigated histologically and found to be essentially due to an irregularly scattered form of disintegration of the medullary sheaths. Granule-cells charged with fatty-like materials and a remarkable proliferation of the neuroglia were also observed in the food. The axis-cylinders of the affected areas, however, did not seem remarkably reduced in number. The adventitial lymph-spaces of the blood-vessels enclosed in these areas contained many cells charged with lipoid granules but no other alterations of the blood-vessels were observed. [Da Fano.]

Bolten, H. Some Noteworthy Cases of Disseminated Sclerosis. [Nederlandsch Tijdschr. voor Geneeskunde, 1919, LXIII, p. 1749.]

The following striking cases of disseminated sclerosis are recorded: (1) Simulation of intracranial tumor, in a man of 24; headache,

giddiness, deafness of right ear, early bilateral optic neuritis, nystagmus, neuralgic pains in left trigeminus area, slight ptosis, and anisocoria lasted for several months. Then appeared clear signs of disseminated sclerosis.

(2) A nervous woman, 24, had had for several years a bilateral abduceus palsy with diplopia, a heavy feeling in legs, headaches, and giddiness. Then these signs lessened. Then signs suggestive of hysteria. Then nystagmus, loss of abdominal reflexes, plus jerks, anesthesia and hypalgesia in cutaneous dress of L_5 and the sacral segments, specially on right, and speech becoming difficult and slow whenever she was tired.

(3) A man, 50, had had for ten years, following on a bladder operation, a spastic paresis of legs, with bilateral Babinski and crossed adductor jerk. Then after this long period of lateral sclerosis he had bladder symptoms, nystagmus, diminished abdominal and cremasteric reflexes, and became sensitive and emotional.

(4) A woman, 34. For seven years giddiness, has twice fallen, but no unconsciousness. Nothing else for seven years. Then slight nystagmus, a suspicion of left Babinski, plus jerks, lower abdominal reflexes lost, unsteady gait, Rombergism, speech difficult and monotonous, general tiredness, emotionalism, and her face showed the peculiar stiffness often seen in disseminated sclerosis.

(5) A girl, 20, began to complain of her sight in 1912: was totally blind in a week. An oculist found bilateral optic neuritis with tortuous veins. Some months later, tingling and dull feeling in legs, then in arms, especially on radial side. Then severe pruritus in limbs. In 1913, left hand was closed for a week; then severe painful attacks in left face and left hemicranium, with cutaneous hyperesthesia there; generally these attacks were preceded by large vesicles filled with clear fluid which in about a day shrivelled up, and seldom burst. Once she had a painful attack in arms and left sole. Sudden improvement in the sight of her worst eye took place after a tiring day. For the next three years no change, except the common fluctuations of the disease. Then she had definite signs, with spastic paraparesis. In this case the unusual features were the hyperalgesia, painful attacks, the vesicular eruption, and the temporary clawed-hand.

(6) A man, 30, had signs of disseminated sclerosis for eight years, then became blind. Was said by many oculists to have bilateral white optic atrophy. But of late he had not complained of his vision. Examination showed pale discs, but not atrophy, vision being two thirds in each eye. This case shows the fluctuations of the disease, with its tendency to recovery from serious nerve-degeneration.

(7) A man, 37, had for a year tiredness, and weakness of left arm. Then left hemiparesis, nystagmus both vertical and horizontal, pale optic discs, scanning speech, Rombergism, left arm intention tremor and incoördination, plus jerks, loss of abdominal and cremasteric reflexes, right Babinski, urinary retention, failure of memory and of power of

fixation (verprüfungs-vermogen), pronounced euphoria, and spontaneous crying attacks. Here there was the seldom seen hemiparetic form of the disease, at first sudden (of apoplectiform type), then gradual. In the acute hemiparesis the palsies are generally transient, but in the slower cases, as here, they show no tendency to recovery. In such cases it is noteworthy that the intention tremor is restricted to the hemiparetic side.

(8) A strong, unusually muscular, athletic man, 40, fell on both knees with but little force while fencing. He rested for a week on account of pain and swelling in knees; on its subsidence, he was unsteady and stiff in the legs, especially in going up a ladder (he was a master builder); unless he planted his foot flat on the lower rung his legs trembled. Examination showed spastic paresis of legs, plus jerks, no Babinski, but knee and foot clonus (not exhaustible), loss of abdominal, and cremasteric reflexes, weak, spastic-paretic gait with great spasm of adductors and calf muscles. Nystagmus a month later. Bolten diagnosed disseminated sclerosis. He has some remarks on the question of the payment of insurance money in this case. [Leonard J. Kidd, London, England.]

Nonne, M. Multiple Sclerosis and Facial Paralysis. [Deutsche Ztschr. f. Nervenh., Vol. 60, p. 201.]

Three cases in which after a period of observation the diagnosis of multiple sclerosis could be made, are here described. In all three there was unilateral transitory facial paralysis with normal electrical reaction. In two of the cases the facial palsy was recurrent. The author infers, therefore, that where facial paralysis of obscure origin makes its appearance or where this disturbance is recurrent multiple sclerosis should be suspected. Further where in making a differential diagnosis a history of a spinal disease suggests multiple sclerosis, if it is found that a transitory facial palsy, for example a disturbance of the eye muscles, had been observed, this circumstance should be considered as evidence of multiple sclerosis. [J.]

Brouwer, B. Friedreich's Tabes and Sclerosis Multiplex. [Nederl. Tijdschr. voor Geneeskunde, 1920, LXIV, 1587 (10 figs.).]

Brouwer reports to the Society for the promotion of Natural Science, Medicine, and Surgery at Amsterdam the results of his thorough histological examination of a case of Friedriech's ataxy, and gives particulars of two other cases. Charcot's school taught that this disease is merely a special form of sclerosis multiplex, the usual opinion being that it is a combined system-disease of the spinal cord in which various fiber-paths, which run in the spinal columns, degenerate separately; these systems are supposed to be of congenitally inferior constitution. But the presence of speech disturbances, nystagmus, and the cerebellar type of the ataxia, together with sensory affections and ocular abnor-

malities, shows that the disease is not a mere spinal cord affection. Marie's "cerebellar heredoataxy" is now out of favor; a brother and a sister had, respectively, Friedreich's ataxy and Marie's cerebellar ataxy. Gordon Holmes has shown that there is a true familial degeneration of the cerebellar cortex. At the present time the matter stands thus:—among the familial ataxias we have (1) Friedreich's, in which we have always spinal cord changes, and sometimes also atrophy of the cerebellar cortex; and (2) the familial cerebellar atrophy, in which the spinal cord is normal and the cerebellar cortex is atrophied. Brouwer reports a case of each kind. His first was a young woman, daughter of a drunkard, who had from the age of eight years a very severe cerebellar ataxia: there was the typical Friedreich picture of pes cavus, loss of reflexes, dysarthria, and hypertonia of joints; also slight optic atrophy, and affection of deep sensibility of the hands rendering stereognosis difficult, with slight tactile hypæsthesia of hands, dysarthria, and slow, monotonous speech. His second case, a man of forty-five, had gait-difficulty when five years old. He has severe cerebellar ataxy, and can hardly stand; continual shaking movements of head on trunk; typical speech disturbances; horizontal nystagmus; no affection of conscious sensibility, nor of deep. His sister suffers from the same disease; so did his father, and probably also the father's brother.

Hitherto the pathological anatomy of Friedreich's ataxy has been mainly confined to an examination of the spinal cord, bulb, and cerebellum; but the 'tween-brain and the fore-brain have usually been very incompletely examined. Brouwer here supplies the deficiency by his careful microscopical examination of the central nervous system of an elder sister of his first case (the woman): the clinical picture of the elder sister's case resembled her sister's, except that she was blind from complete optic atrophy. In the sacral cord there was the usual degeneration of dorsal columns, dorsal roots, and lateral pyramidal tracts; there was also a sclerotic focus in the left ventral horn, extending into the lateral column. The lumbar cord shows some degeneration in the dorsal horns, and plaques of glia-proliferation. In the thoracic cord there is degeneration in the dorsal columns, and plaques; slight degeneration in crossed and direct pyramidal tracts; silver preparations of the dorsal columns show numerous axis-cylinders preserved, as in sclerosis multiplex. The cervical cord shows appearances as of a combined system-disease, but we come rather suddenly on a sclerotic patch in the left lateral column. At the spinobulbar junction there is degeneration of dorsal columns, with plaques; no ascending degeneration of the spino-cerebellar tracts. The bulb shows plaques, often with a blood-vessel in their center; there are some in the left pyramidal tract, and also in the right restiform body, the lateral part of which is quite white. The mid-brain shows similar plaques. In places throughout the cerebellum there is loss of myeline, with great glial proliferation in most of them; no narrowing of the molecular or the granular zone; Purkinje's cells

are, at most, somewhat less numerous than normally, and many of them show slight degeneration. Generally speaking, this layer of cells is not much affected. The intrinsic cerebellar nuclei are normal, except for occasional plaques. In the nodulus cerebelli there is a local cortical alteration, which Brouwer interprets as a congenital deformity. The 'tween-brain shows sclerotic patches in places, as in the external geniculate bodies; the optic nerves are greatly degenerated. The optic thalamus is not altered, and its various cell-groups are preserved. The corpus striatum has the normal size and normal microscopical appearances. The cerebral cortex has small plaques in numerous places: in the occipital lobe the fasciculus longitudinalis inferior is paler than usual, and shows plaques. The giant cells of Betz could not be found. In many places throughout the central nervous system Brouwer found signs of a chronic inflammatory process, viz.:—perivascular infiltration, plasma cells, rod-cells ('stähchenzellen'), and pial thickening. In only a few places were there any changes in the walls of the blood-vessels. In this case there was no Wassermann evidence of syphilis.

Brouwer says that among the cases which are clinically grouped in the symptom-complex of Friedreich's ataxy there are some that show such a close affinity to sclerosis multiplex that one may speak of a special form of this disease. The more or less systematic degeneration of the pyramidal tracts need not militate against this, for this often occurs in the ordinary multiple sclerosis. A chance combination of the two diseases seems to him inadmissible, because similar anatomical pictures are often described in the older literature. It was just these findings that led the French observers to argue that Friedreich's ataxy is nothing but a special form of multiple sclerosis. But, while there is, undoubtedly, a close relationship between these two diseases, is it certain that the existence of multiple sclerosis is satisfactorily excluded? The morbid process is not exclusively confined to the white matter, for Mott found abnormal glial proliferation around the central canal, and Bing has seen local loss of medullary sheaths in the gray matter. Brouwer therefore thinks that we should not regard our knowledge of the pathological anatomy of Friedreich's ataxy as settled, but should ask ourselves if we have the right to speak of a system-disease, and also whether, after all, this disease is a special form of multiple sclerosis.

As to the question whether multiple sclerosis is due to a primary glial disease or to a chronic inflammatory process, Strümpell believed that the central nervous system was congenitally weak, so that the neuroglia gained the upper hand over the proper nervous tissue which therefore degenerated. As to the second theory, an infective agent was supposed to reach the central nervous system by way of the blood-stream. In the first an endogenous cause was at work, in the second an exogenous. The second theory is now predominant. Steiner and Kuhn (1918) have, by experimental injection of the spinal fluid, the blood, and parts of the central nervous system from cases of multiple sclerosis,

produced palsies in various mammals; they suspect that the infecting agent is a special form of spirochæte. Brouwer compares multiple sclerosis with poliomyelitis; at first the latter was called a system-disease with a powerful endogenous factor; but, when the more acute cases were investigated, an inflammatory exogenous cause appeared; and now it has been produced experimentally, and it is believed that the virus has been discovered (Flexner and Noguchi). While our attention is now fixed especially on the exogenous moving cause, yet we must not lose sight of the endogenous: the soil on which the disease is sown must play a part in the case of sclerosis multiplex. Brouwer quotes a personal experience:—a mother had syringomyelia, her son sclerosis multiplex; both diagnoses were confirmed on necropsy. In cases of Friedreich's ataxy, as in Brouwer's case, the endogenous factor must carry great weight, firstly because of its familial occurrence. The same thing is known to occur in ordinary sclerosis multiplex, and slowly but surely the number of familial cases of this disease recorded in the literature increases. But familial cases occur much oftener in Friedreich's ataxy, being the rule here, whereas they are the exception in multiple sclerosis. But, in addition to this, the endogenous factor must play a large part, for anatomical investigation shows that the central nervous system is repeatedly found to be too small. And this reduction in size is not always limited to the spinal cord, for Brouwer cites the work of Thomas and Durupt who found that the dorsal parts of the brain-stem were too small in comparison with the ventral, and yet no evidence of any inflammatory process was found. Similarly, when an anatomical examination has been made early in the course of the disease this small size has been found. But there are other signs which show the congenital alteration of the central nervous system, such as duplication of the central canal. And Brouwer found a deformity of the nodulus cerebelli in his anatomically studied case. With regard to the degeneration in the dorsal columns and dorsal roots, Brouwer sums up thus:—the patient is born with a congenitally weak and vulnerable central nervous system (alcohol in the father, etc.); he is attacked by a noxious causal agent which at other times produces a disseminated sclerosis. This germ-disease, attacking a congenitally feeble central nervous system, produces the usual plaques of sclerosis, but the toxines have enough power to damage the congenitally feeble nervous system to such an extent that plaques occur in the dorsal columns and dorsal roots. The infection attacks the nervous system during the early period of life when the power of resistance to noxious agents is small. But we do not yet know why the sclerotic plaques show such a predilection for the dorsal spinal column. In any case, such an observation, as Brouwer offers us here, compels us to ask whether we do right to make such a sharp division between these two diseases, Friedreich's ataxy and multiple sclerosis, and also whether we have not gone too far in our specialization of neurological clinical pictures. Before we can arrive at a verdict,

we must not limit our anatomical studies to cord, bulb, and cerebellum, but must also make an exact analysis of the pathologico-anatomical relations of the remaining parts of the central nervous system. [Leonard J. Kidd, London, England.]

Brouwer, B. The Central Nervous System in Pernicious Anaemia. [Psychiat. en Neurolog. Bladen, 1915, n:6.]

Brouwer gives an exhaustive account of the microscopical changes in the central nervous system from a case of pernicious anæmia. A coachman, 38, had severe diarrhœa for many weeks, with pallor and fatigue, but no neurological signs. Four months later, pain on pressure over McBurney's point, suggesting chronic appendicitis. Then neurological signs began. Death five months later. Legs became stiff, with plus reflexes; the blood showed pernicious anæmia; he had ups and downs, and died from exhaustion. The nervous signs showed three periods, (1) paresis of both legs, with Babinski: then slight affection of deep sensibility in legs, and subjective sensory symptoms, but no bladder trouble: arms normal; (2) increased paresis in legs, and also more deep sensibility disturbances in toes, definite affection of pain- and touch-sensibility reaching to knees, spasms in the extremities, and bladder symptoms; (3) a short final period of great increase of leg-spasms, and extension of sensory changes up to navel. Now the arms showed plus reflexes with paresis, ataxy by finger-to-nose test, disturbance of deep sensibility in hands. But—and this point is specially referred to later in the paper—the cutaneous sensibility was normal, with accurate localization, in the arms and hands within the last week of life. Normal, well localized cutaneous sensibility in legs. Good perception of pain and temperature in arms and hands. Nystagmus on extreme outward deviation. Now and then the pupil light reaction failed, and he had retinal hemorrhages. Necropsy showed great anæmia of all organs and of central nervous system. The whole brain and cord was cut in serial sections, every tenth section being kept. No changes in coccygeal and two lowest sacral segments. In S_3 only slight in lateral pyramidal tract. In S_2 this is plainer. In S_1 foci in dorsal columns, oblong and running in direction of posterior septum. In lumbar cord these foci are larger, especially in L_1; here there is pronounced pyramidal degeneration. The cells of Clarke's column are chromatolyzed. In thoracic cord foci are larger: in the lateral columns degenerated fibers come out of the region of the lateral pyramidal tracts, and foci also enter the ventral pyramidal tracts. In the midthoracic region the changes in the white matter are still greater, so that in the dorsal columns there is merely a small zone preserved along the dorsal horns, while many fibers of spinocerebellar tracts are degenerated. Two kinds of changes are distinguishable, (a) old, (b) newer. In the older there is much glial proliferation and merely a few degenerated axis-cylinders to be seen. In the newer, almost all glial proliferation is lacking, but one sees swollen axons, and swollen

and partially pathologically altered medullary sheaths. Nowhere were there any cell-infiltrates, nowhere hemorrhages. Ventral horn cells everywhere normal. The cervical cord shows very extensive dorsal column changes. But everywhere the dorsal root entry zone is normal, and so are the dorsal roots themselves. Changes in lateral and in ventral columns. The distinction between old and new degenerated zones is especially seen in the dorsal columns. From C_3 up, the pyramidal ventral tract is wholly intact, and more and more normal fibers appear in the lateral pyramidal tracts. But the degeneration in the dorsal columns and in the spinocerebellar tracts is at least as great as in more caudal sections. At the spinobulbar junction a new focus appears, that includes almost the whole of the pyramidal decussation; and there are foci in the tracts of Flechsig and of Gowers. The bulb shows fresh foci in the pyramidal path above the decussation; in the upper bulb these paths show less marked changes, so that in the pons they could hardly be recognized. But there are foci in the restiform body; these also are of recent date, and they become less marked at the upper part of this body. No changes in cerebral or cerebellar cortex. Brouwer concludes that these pathological changes in the central nervous system are not due to a myelitis, nor to a true conbined system-disease, but to a focal degeneration. This degeneration is not a sequel of a toxic process that attacks the spinal cord by way of the blood, but depends on a state of lowered nutrition of the spinal cord, due to the poor quality of the blood, by which means those parts of the cord which are least well supplied with blood, viz., the white matter of the columns, suffer first and most severely. In this respect pernicious anæmia resembles other exhausting diseases. Brouwer adds that his case supports the theory that not all kinds of tactile sensibility stimuli are conducted by the dorsal columns, for these were wholly degenerated in the cervical cord and yet during the last week of the patient's life tactile sensibility was well perceived and localized in arms and hands, though deep sensibility was greatly affected. He has some remarks on the question of function and also of Edinger's "Aufbrauch-theorie" [Leonard J. Kidd, London, England.]

Wintrebert, P. Medullary Conduction in Selachians, and the Function of the Transient Giant Dorsal Intraspinal Cells of Rohon-Beard. [Compt. Rend. Acad. des Sci., 1920, CLXX, May 3, p. 1082.]

The writer has previously shown that at the time of formation of the neuromuscular junction in selachian embryos the continuity of the spinal cord is not indispensable for the propagation of antero-posterior conduction: a resection of six myelomeres can be performed without interruption of the undulatory movement. At the time of establishment of neuromuscular connection the conduction of the spinal cord is effective over a length of about fifteen metameres. The propagation of the

undulatory movement from one end of the embryo to the other needs the active participation of the myotomes; their contraction provokes a stimulus which is the point of departure of a reflex which causes contraction of the more distant myotomes; the transmission of the contraction-wave is thus the result of a succession of reflex arcs which depend the one on the other. The centripetal path by which these embryonic movements are conducted appears to be established by the transitory giant dorsal intraspinal cells of Rohon-Beard. These cells are connected anatomically by their peripheral processes both to the skin and the myotomes. Their axons are distributed to the motor neurones on the same side of the spinal cord. [Leonard J. Kidd, London, England.]

Strasburger, J. Flaccid Paralysis from Projectile Wounds in the Upper Medulla Oblongata and in the Brain. [Deutsche Zeitsch. f. Nervenh., Vol. 60, p. 43.]

The author discusses the character of paralysis produced by injuries localized above the reflex arc of the limbs affected. The theory that an interruption of the central motor conduction paths produces an exaggeration of the reflexes and a heightening of the muscle tonus was disputed by Bastian, who held that a complete interruption of the paths in the medulla regularly causes absence of reflexes and flaccid paralysis. Exceptions to this rule were offered by Fr. Schultze and others. In all the cases observed by the writer the picture was unvarying; serious fresh injuries of the medulla oblongata showed flaccid paralysis, no matter at what level the projectile wound was situated. Various explanations of the phenomenon *which have been offered* fail to account adequately for all the facts. Bastian's assertion that the preservation of the muscle tonus and tendon reflexes is dependent on the integrity of the path to the cerebellum is disproved by those cases observed by the author where this path was completely interrupted by transverse lesions, the tendon reflexes were nevertheless preserved. The flaccid paralysis in the author's cases could not have been due to a bleeding in the vertebral canal or subarachnoid space from which a pressure on the reflex centers in the lumbar region had resulted, because in various cases where autopsies were performed either no blood influx was discovered or it was negligible. Nor was there any choking of the spinal fluid. The assumption of a general shock or diffuse anatomical alteration affecting the medulla oblongata, also, does not satisfactorily explain all the conditions. In wound of the brain the paralysis is at first flaccid with absence of tendon reflexes and this condition may persist for some time. The author does not here refer to the apoplectic coma, but to a localized destruction of tonus and reflexes which continues in the paralyzed member after return of consciousness. Even by the most careful examination it would be impossible to determine whether or not the injury of other paths than the pyramidal is responsible for the peculiar behavior of the reflexes and

muscle tonus of recently injured cases, because local effects and distance effects, destructions and irritations cannot be separated. Whether the hypotonus was due to an interruption of the paths favoring the tonus or to a stimulation of inhibitory paths may, however, be answered with probability in favor of the latter supposition, for if the wounded person survived the first ill effects of the injury the deflexes the tonus returned and in some cases was even exaggerated, which would scarcely have happened if the tonus conducting paths had been destroyed. [J.]

Oppenheim, H., and Borchardt, M. TUMORS OF THE MEDULLA OBLONGATA. [Deutsche Ztschr. f. Nervenh., Vol. 60, p. 1.]

From a series of cases observed by them the authors describe three. The first case presented the clinical peculiarity that radicular pain was absent. Though this, as a rule, is one of the most important signs of tumor of the medulla oblongata and one of the earliest to make its appearance, yet it has long been known that the neuralgic phenomena may be absent—according to Serco in one half the cases (an estimate which seems to be too high, however). Therefore there should be no hesitation in making the diagnosis of tumor of the medulla oblongata merely because the radicular symptoms are not found. For at least part of the cases Schultze's interpretation holds good, namely, that the pressure of the tumor obstructs the sensory conduction paths, preventing the pain stimuli from reaching consciousness. But there must also be other conditions which cause the same result, especially the situation of the tumor in relation to the anterior root, or its slow development which would permit the root to yield to the growth and adapt itself to compression, or, finally, the factor of the individual sensibility to pain. In this first case only the radicular pains were absent; in the stiff and palsied lower extremities there was pain referable to irritation of the conduction paths. The character of the contractions in this case were also quite unusual, the hip and knee points being bent at an angle so that the upper thighs were brought forcibly together and the inner surface of the knees pressed against each other. This tense condition was not constant; at times there were involuntary movements and twitchings which changed the picture to that of a spasmus mobilis. The knee jerk could not be elicited, but there was foot clonus and the spastic reflexes were present.

Besides, there was lively irritability of the skin reflex and an extension of the reflex zone over the whole lower half of the body. In the author's experience the type of contraction in this case, that is of the flexors, is very unusual with tumors of the medulla oblongata. Case 2 had long been diagnosed by various physicians as hysteria. It is of interest because it co-existed with Basedow's disease. In case 3, there was absence of local pain, showing that the neoplasm may be localized in the region of the posterior root and posterior column without giving rise to this

symptom, but otherwise the case was a typical one. If the tumor is removed it is preferable to give a general anesthetic and that the extirpation would be made in a single operation. In the after-treatment measures should be taken to prevent the formation of a fistula; the abdominal position used by Quervain is recommended. [J.]

III. SYMBOLIC NEUROLOGY.

1. GENERAL PSYCHOPATHOLOGY — NEUROSES — PSYCHONEUROSES.

Kläsi, Jakob. Differential Diagnosis of Congenital and Hysteriform Acquired Homosexuality. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. LII, p. 54.]

The question whether homosexuality is congenital or acquired is one concerning which there is much controversy. Hirschfeld is of the opinion that it is inborn, that the tendency follows its course notwithstanding all influences in the opposite direction and makes its appearance in the very earliest years of life. Kraepelin takes the opposite view, seeing in homosexuality an arrest in sexual development. Freud and his follower, Sadger, believe that the perverse tendency is due to the effect of infantile sexual experiences—to repression and transference. Alfred Adler speaks of his "above and below schema" of the "manly protest" of the "effort for security," regarding as a scientific superstition the view that homosexuality is congenital or of compulsory character. The opinion of the author is that no violence is done to nature by assuming that there are cases where perverse sexual feelings are to a greater or less degree congenital. It is seen that nature makes mistakes and false movements in every other sphere, and why should sexual development alone unerringly reach the ideal degree of evolution without any transitional forms. In illustration of his view, the author describes four cases, contrasting the first three with the fourth. This fourth patient regarded the lack of heterosexual feeling as a self-understood condition, arising from congenital perversity. In the first three cases impotence gave rise to severe mental distress and conflicts which were the more painful the more the feeling of weakness spread from the sexual to other spheres and became the symbol of general inferiority and inadaptability to life. The pressure for solution of the problem and for escape from the feeling of weakness became intolerable. Suddenly the thought emerged that the trouble was due to homosexuality—a thought which was more acceptable than that it should be due to impotence. Cases 1 and 2 themselves asserted that they were relieved to find themselves homosexual. From facts such as these the author infers that homosexuality serves as a justification and disguise for the impotence complex and represents a well-known hysterical mechanism. Where, in the symptom complex of so-called true

homosexuality, the impotence complex (fear of impotence, hypochondriacal anxiety concerning the same) makes its appearance, it may be assumed that the case is not one of congenital, but one of hysteriform acquired homosexuality. In regard to treatment and prophylaxis, the author states that the hope of cure depends on whether the patient suffering from hysteriform homosexuality desires to get well or not. The therapy consists in strengthening self-confidence through purposeful and strenuous work. [J.]

Oberndorf, C. P. Homosexuality. [Medical Record, Nov. 22, 1919.]

In this article, which may be regarded as supplementary to the one on Auto-erotism, Oberndorf states that the analytic studies of sexual histories frequently reveal the existence of physical and psychical homosexual elements in association with auto-eroticism. As a working basis, conscious homosexuality may be divided into two classes, subjective and objective. He is inclined to believe that subjective (passive) homosexuality in the male is a sexual intermediary state, probably determined by physical biological anomalies. Active or objective homosexuality should be regarded as a compulsion neurosia. Such persons show no physical sex variations and at some time in their lives showed a normal attitude in regard to the libido. The outlook for curing subjective homosexuality is not favorable. Objective homosexuality is, however, often amenable to psychoanalysis.

Dr. Oberndorf does not intend in any way to exalt homosexuality nor to belittle the grave social consequences which sometimes result from the abnormality. However, he considers it logical to regard homosexuality as a disease; that is, in the active form, as a compulsion neurosis, and in the passive form, as an organic defect. He believes that homosexuality should be considered as a crime principally when there has been some direct and unsolicited infringement upon the person of another. In conclusion, he states that while the active homosexual is a greater social menace, he is as a rule probably not so profoundly mentally diseased as a severe case of auto-erotism. [Author's abstract.]

Freud, S. Metapsychological Supplement to Theory of Dreams. [Internat. Zeitschift. f. a. Psychoanalyse, Vol. iv, No. 6.]

The purpose of this article is to render clear the mechanism of wish-fulling hallucinations. For the better understanding of pathological conditions, says Freud, it is advantageous to draw comparisons with what may be called the normal analogies of these conditions, with mourning, for example, with sexual passion, or with dreaming. In preparing for sleep, people take off the outer covering of their bodies, lay aside those devices of which they make use to replace what is lacking in their various organs, spectacles, false hair, false teeth, etc. We can imagine the psyche going through an analogous process in going to sleep, divesting itself also of acquired complements; so that in both

bodily and spiritual sense people find themselves in sleep in pretty much the same condition they were in at the beginning of the developmental processes in life. The physical condition in sleep is a return to the state in the body of the mother — the state of quiescence, of warmth, of withdrawal from stimuli — sometimes even a foetal position of the body is assumed. The psychic condition is one of complete cessation of interest in the outside world. Herein psychoanalysis sees a regression to an earlier developmental period, that of narcissism. The effort of the wish to sleep, however, is sometimes only partly successful, for not all the cravings repressed into the unconscious obey it, and besides there are remnants of the day experiences which retain a certain amount of energy. Though not of themselves very powerful, these remnants acquire sufficient force to destroy the narcissistic oblivion when, in the foreconscious, they are strengthened by affective charges from the unconscious, thus forming the dream wish. This wish, seeking expression, has three possible paths open to it; it might proceed directly from the foreconscious to consciousness, a path never taken in sleep, however; or, circumventing consciousness, it might find a way directly to motor activity, as in somnambulism; the third path is that really taken in dreams, retrogressively to the unconscious, and thence to consciousness as sense perceptions. The completion of the dream process thus consists in the elaboration of the content, composed of the day remnants and the unconscious craving, into conscious sense perceptions. The wish is hallucinated and is believed to be reality. This latter part of the dream work is the most difficult to understand and receives some elucidation from the mechanism of certain mental diseases. The same processes are met with in acute hallucinatory confusion, in amentia (Meynert's), and in the hallucinatory phases of schizophrenia. The hallucinatory delirium of amentia is so unmistakable a wish-fulfillment phantasy that the name hallucinatory wish psychoses may be applied to affections of this sort. The hallucinatory phase of dementia praecox has not been so well studied, but as a rule the hallucinations seem to be of composite nature and probably arise from wishes in the direction of restitution, being essentially an attempt to again endow the idea of the object with libidinous affect. The process of hallucinatory wish-fulfillment, whether in dreams or elsewhere, is composed of two entirely separate performances. Not only are the repressed wishes brought to consciousness, but they are placed there in the form of having been fulfilled. Freud holds that no one of the factors — that the dream is a conscious wish, that it is a sense perception, or that it is a regression — in itself furnishes sufficient explanation for the belief in the reality of the dream or the hallucination and accounts for the wish-fulfillment principle as resulting from a reversional disappearance of the reality test, or capacity of distinguishing real experiences, conferring true satisfaction from imagined experiences. At the beginning of our phychic life we do not possess this capacity and the first orientation of the helpless organism in the world comes with the

development of the ability to recognize "inner" and "outer," which itself is connected with the power of putting a termination to painful stimuli from the outer world through motor activity. This capacity belongs to the conscious perceptive system and is one of the great institutions of the ego, comparable to the censors between the different conscious systems. Pathological conditions, better than dreams, illustrate the mechanism of the hallucinatory wish-fulfilling principle. Amentia, for example, is the reaction to a loss which the reality critique maintains is real, but which the ego denies as intolerable. Hereupon the ego withdrawing a certain energy charge from the conscious perceptive system, breaks off the relation with reality, setting aside the reality test, so that the repressed phantasies, emerging into consciousness, are there valued as better realities. In the dream there is withdrawal of energy (libido interest) from all systems alike; in the transference neuroses, there is withdrawal of energy from the foreconscious; in schizophrenia, from the unconscious; and in amentia, from the conscious system. [C. W.]

Ferenczi, S. Erotic Tendencies and Character Traits. [Internat. Zeitschift. f. a. Psychoanalyse, Vol. iv, No. 3.]

A series of cases is here described, in which certain traits of character revealed a tendency to regress to their primitive elements, giving rise to a mingling of the unconscious element and the sublimated form, and thus proving unequivocally the origin of the latter. The case of a youth who confessed before the juvenile court at Pozsony that he had taken paper money out of a contribution box by means of a stick covered with feces, to which the money adhered, is the first one described. The author emphasizes the impossibility that this peculiar mode of satisfying the greed for money was determined by mere chance, and sees in the deed a fundamental neuropsychic coprophile tendency, a recoil of a repressed element on the repressing force, with consequent combination of an infantile anal erotic component and the character trait, miserliness, the sublimated derivative of the primitive tendency. A woman suffering from "housewife's psychosis," in which the rage for cleaning was limited to scrubbing lavatories, is a second instance revealing a merging of an anal erotic element with a derivative on a higher level. In a group of cases cited as a third example pronounced miserliness was principally in the direction of refusing outlay for certain necessities, as for laundry and for toilet paper. Case four is an instance of a boy who swallowed kreutzer in order that they might be polished by the chemical secretions of the alimentary canal and later sought them out in the excreta — a combination of two traits of character, cleanliness and love for money with the original anal erotic tendency. A man who exhibited undue anxiety for punctuality in regard to movements of the bowels is cited as a fifth case of similar combinations.

In the confirmation of the view that incendiarism is connected with

urethral eroticism, and hence with enuresis nocturna, the author refers to a large number of cases in which incendiaries set fire to their beds. One man with bladder inferiority became a zealous voluntary fireman, and later this same man became a physician and chose urology as his specialty. The author offers these examples as inconvertible evidence against Jung's views, according to which the erotic symptoms discovered by analysts are to be regarded as symbolic rather than real. The constant emerging of primitive tendencies in combination with traits which have apparently reached a high level of sublimation prove that the unconscious erotic elements take every opportunity of realization under disguise — often, indeed, under very transparent disguise. [C. Willard.]

Ferenczi, S. War Neuroses Types [Internat. Zeitschift. f. a. Psychoanalyse, Vol. iv, No. 3.]

Judging from the symptoms the impression when numbers of patients suffering from war neuroses were seen together was that they were suffering from severe lesions of the brain or medulla. It was difficult for the writer to relinquish this idea even when careful examination revealed none of the somatic signs which invariably accompany palsies and tremors due to organic injuries. Recognition of the true nature of the disturbances was first possible when smaller groups of patients were examined, in whom not the whole body, but certain parts were affected. The study of these monosymptomatic cases permitted a nosological classification of the palsies and tremors in the group of functional affections, or psychoneuroses. Histories of injuries given by patients was confirmatory of this classification. For example, one patient stated that atmospheric pressure on the left side had produced motor symptoms of the same side, whereas, if the injury had been organic, the resulting symptoms would have been on the heterolateral side. The author's explanation of these symptoms is that they are the result of a psychic condition, i. e., hysteria, in which there is a traumatic fixation, as it were a psychic accent, on some one part of the body. A man who was suffering from a contraction of the left arm, for example, remembered that he was shocked just as he held the weapon in a balancing position, and this position corresponds exactly with the changes imitated in the contraction. The possibility of a real lesion affecting the numerous and disconnected muscle groups involved must be rejected. On the other hand, it seems quite plausible that there should have been a fixation of the muscles which were in a state of innervation at the moment the fright occurred; in analogy with the condition that arises when one is frightened and the feet seem to be rooted to the spot. Actors are acquainted with this reaction and make use of it in portraying the effects of fright. Breuer and Freud have explained the mechanism of the conversion of emotion into somatic innervation, and in numerous instances psychoanalysis has traced such cases of conversion hysteria to affective experiences which may themselves be unconscious or forgotten (or, to use the expression

of the present day, repressed). The author regards these monosymptomatic forms of war neuroses as cases of conversion hysteria. The sudden ungovernable affect (the fright) constitutes the trauma. The innervation which at the moment of the fright is in play is held fast as the symptom. In other words, the patient has never recovered from his fright even though he no longer thinks of it, or, it may be, is even happy at times, as though his soul were troubled by no terrible memory.

In the second, much larger group of patients, in which there was general tremor and disturbances of gait, a similar observation of the accompanying symptoms, together with the histories of the accidents, furnished the clue to the true nature of the disturbance. In the opinion of the author they belong to Freud's group of anxiety hysteria, of which, in many instances, the characteristic is extreme anxiety upon every attempt to change the position of the body. Neurologists have long recognized these conditions as phobias, calling the disturbances of innervation astasia (inability to stand) and abasia (inability to walk). Psychoanalysis has succeeded in proving that the cause of the condition is a psychic trauma, involving destruction of the self-confidence of the individual. Repressed into the unconscious, the emotional element constituting the trauma produces a state of anxiety. Whenever there is danger of a return of the original painful situation. The most extreme development of this system of defense is the hysteric astasia-abasia encountered in those suffering from war neuroses. From the history and psychoanalysis of several cases, the author was led to believe that the atmospheric pressure of the shell explosion, by throwing the patient to the ground and opposing his purposes, may have called forth extreme reaction on the part of the ego, with consequent regression, ontogenetically, to the level of the first years of life, in which he was unable to stand or walk — a level corresponding to a stage in the phylogenetic model.

In reference to the assertion that Freud's theory of the sexual nature of the trauma which produces anxiety hysteria, is disproved by these cases where the shock is "certainly not of sexual nature," the author sees no necessity of drawing such a conclusion. Loss of sexual libido, and consequent impotence, are frequent phenomena in these cases, and it is altogether probable that the shock may be produced by way of an injury to the ego, to the self-love, causing regression to narcissism, that is, the withdrawal of the libido from the object and its concentration on self.

Freud, S. TRANSFORMATION OF NATURAL TENDENCIES: ESPECIALLY ANAL EROTIC. [Internat Zeitschift. f. a. Psychoanalyse, Vol. iv., No. 3.]

Freud, long convinced that the coexistence of the three characterological traits, pedantry, miserliness, and obstinacy, indicates exaggeration of an anal erotic component, undertook the study of the development

of these traits for the purpose of tracing their interconnection and their relation to infantile sexual life. He found that in the first years of life, before the libido becomes centralized in the genital region, sadism and anal eroticism play the principal rôle in the sexual organization. An important question, then, is, what becomes of the anal eroticism at puberty, when the final genital organization is attained, and it no longer participates directly in the sexual life? Is it repressed into the unconscious and does it continue to exist there, unchanged? Does it undergo sublimation and transformation into certain peculiarities of character? Or is it absorbed in the new form of sexuality arising from the differentiation of the genital elements? Or, finally, does the anal eroticism follow no one of these destinies exclusively, with the result that some sort of compromise is affected? And if this latter is the case, in what proportion does each of these possible developments enter into the ultimate characterological make-up? Illuminating for the solution of the problem, the author points out, is the fact that the same words are used to designate objects connected with the early anal erotic period and those connected with later adult life, suggesting identity of emotional endowment. In the productions of the unconscious, that is, in thoughts, phantasies, and symptoms, the excreta (taken also in the sense of money or presents), the child, and the penis are but imperfectly distinguished from each other, and in the unconscious itself the objects belonging to these designations are treated as equivalents. In girls the unconscious wish for a penis, it becomes apparent in neuroses in later life, is metamorphosed into a wish for a man as the possessor of the desired organ, and thus a part of the striving toward maleness characteristic of the narcissistic level of development is utilized to reinforce the female rôle of young women. The author was able to verify this fact by analysis of the dreams of young wives after the first cohabitation. The anal eroticism is also found to reinforce the feeling tone connected with the genital organs. Further facts showing the inter-connection of infantile eroticism with the later organization are the following: The new-born child is often spoken of as a "Lumpf;" this same word is also applied to excreta. The child is often spoken of as a present; the first act of giving by the nurseling consists in parting with the excreta — giving part of its own body. In thus ceding something to another, it first begins to discriminate between the narcissistic attitude and that involving love of an object. Very probably, the author believes, neither gold nor money, but the present, the act of giving, is the central feeling from which the others connected therewith develop, the first interest of the child being in the preductions of his own body. The infantile interest in excreta is thus found to be transformed in part into an adult interest in money and in part into a wish for children, so that in this wish an element of the anal erotic stimulus and the genital stimulus are combined. The penis, however, has a significance connected with the anal erotic level wholly independent of the interest in the child, a fact

learned from the behavior of those persons in whom the anal erotic period persists into the 10th or 12th year. The phantasies and perverse practices in these instances prove that the rôle of the vagina and penis is foreshadowed in the sensitiveness of the anal mucous to the stimulation of retained feces. Diagrams are given, illustrating the interconnections and readjustments of sexual components. The author calls attention to a phase of the reorganization peculiar to males. The sexual investigations of the boy reveal the absence of a penis in females, and he thus obtains the idea of a detachability of the organs from the body — in analogy with the excreta. There is no organic representation of this detachability in male life, but there are psychic substitutes for it, apparent, for example, in the castration complex. The author notes that the feature of special interest in these developments and derivations is the proof they bring of a direct parallelism in the transformations occurring in the organic life and those taking place in the psychic sphere. [C. Willard.]

Fischer, Heinrich. EUNUCHOIDISM AND HETEROSEXUAL SEXUAL CHARACTERISTICS. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. LII, p. 117.]

Many writers maintain that in eunuchoids heterosexual characteristics are developed. They speak of "character traits of femininism," "gynecomastia," etc., in male eunuchoids. Importance is given in their descriptions to the hair growth, but the author states that the hirsutic distribution is not a characteristic of sex but one of species, and various observations render it highly probable that the influence of the sexual glands on the hair growth—which is at most only quantitative—is not a direct one, but is brought about by a correlation and only with the aid of other glands, particularly of the suprarenals. One of the principal reasons why male eunuchoids are said to acquire feminine characteristics is because of the distribution of fat, but to true gynecomastia belongs the development of the parenchyma of the breast glands which is never found in male eunuchoids. The layers of fat make the bodies of eunuchoids resemble those of women in outward appearance, but the development of muscles and tendons is an essential male secondary characteristic, and in eunuchoids the absence of such development would account for the resemblance without the assumption of positive development in female direction. It is further stated that the form of the neck of eunuchoids resembles that of women much more than that of men, particularly because of the absence of development of the prominentia laryngea, but the larynx, according to autopsy findings, resembles the enlarged larynx of a child rather than that of a woman. The structure of the female thorax, according to accurate measurements, differs essentially from that of eunuchoids, and this is one of the features which certainly belongs to the female secondary sexual characteristics. Notwithstanding an apparent similarity in the structure of the pelvis of

eunuchoids and women. careful anatomical examinations and measurements reveal that the pelvis of eunuchoids differs from that of females more than from that of males. Eunuchoids and females have nothing in common in the proportions of the skeleton, much less than have males and eunuchoids. The mere external resemblances are no justification for ascribing female sex characteristics to eunuchoids. From such similarities as really exist, and from the common deviation of both eunuchoids and females from the male type. the inference could more reasonably be drawn that women in many respects approach an asexual type, owing to a less pronounced differentiation of the distribution of fat, development of muscle, etc., under the influence of the female sexual gland than is the case in the male sex. In other words, the traits upon which the resemblance to eunuchoids depend are not sexual characteristics at all, or are only so in a slight degree of differentiation. In women the whole innersecretory energy of the genital glands is consumed in the construction of organs of reproduction and those designed for the nourishment of the offspring. The author states in further proof of his view that the psyche of eunuchoids reveal no feminine traits, and further, that there is more resemblance between the hypogenitalism and the female type than between the latter and eunuchoidism, but that these two disturbances are of totally different nature. eunuchoidism being a well-defined constitutional disease. hypogenitalism only a symptom. [J.]

2. PSYCHOSES — DEFECTIVE STATES.

Kraepelin, Emil. Concerning the Epilepsy Problem. [Zeitschr. f. d. ges. Neurol. u. Psychiat., 1919, Vol. LII, p. 107.]

The disease processes connected with epilepsy may be divided into two main groups, one in which the symptoms are probably the effect of intoxication and one, at the foundation of which there are gross changes in the brain. In the first group the toxic influences are most obvious where the seizures occur as direct result of poisons taken into the system (lead, carbon monoxid, santonin, etc.); not so obvious in the case of infectious diseases and even less so in intoxications from disturbances of metabolism. In this group belong also the epileptic seizures resulting from excision of the thyroids. The origin of epilepsy in dementia praecox is more obscure. Sometimes the epileptic seizures precede the onset of the praecox, and many such cases are understood as "dementing epilepsy," although symptoms characteristic of dementia praecox show the error of this diagnosis. Concerning the manner in which the schizophrenic epileptiform seizures are produced, as little is known as concerning the origin of the basic disease itself, but it may be assumed that the attacks arise from the same cause as the sudden deaths which sometimes occur, and which the author believes are possibly due to a flooding of the brain with poisons arising from disturbances of metabolism. Similar

assumptions may also explain the rare seizures in manic depressive insanity; eclampsia of children is also referable to disturbances of metabolism. To the second group, that in which the seizures occur in connection with tangible brain disease, belong the convulsive attacks in brain lues and paralysis. The paralytic attacks, aside from those occasionally observed which lead rapidly to death, and the simple fainting fits, usually have the characteristics of cortical epilepsy with a spreading of the twitching over various separate cortex regions. In juvenile paralysis general epileptiform attacks dominate the disease picture. There is an inclination to place "late epilepsy" in causal relation with arteriosclerosis, but all epileptiform cases occurring after a certain age limit should not be separated from general epilepsy from this fact alone, but, on the other hand, it is not impossible that arteriosclerosis may give rise to epileptic seizures. Midway between the two main groups here described are the numbers of cases known as "genuine epilepsy," for the influence of nutritive factors and variations in metabolism on the attacks indicate that intoxication plays a rôle; anatomical examinations also show extensive changes in the brain tissues. The distinguishing symptoms of genuine epilepsy, however, are the changes in the total mental personality, which are so characteristic as to sometimes indicate the presence of the disease where there are no seizures, arousing the suspicion that there might be "epileptics without epilepsy." Notwithstanding the indefiniteness of the epileptic syndrome, it is nevertheless possible to exclude certain conditions which have a superficial resemblance to epilepsy, from the disease picture, as, for example, "affect epilepsy" (Bratz). Such cases have led to the name "hysteroepilepsy." If this name signifies a transition from hysteria to epilepsy it should be forthwith rejected. There is a wide difference between the disease picture of "affect epilepsy" and that of epilepsy, the former disease having an essentially hysterical character. The mere fact that there are seizures resembling those of epilepsy does not prove the identity of the two diseases, for seizures of the same sort are caused by whole series of brain injuries which differ greatly from each other, and even psychic excitement can cause these attacks. The author also regards the habitual epilepsy of alcoholics as a form of hysteria. [J.]

Ganter, Rudolph. CONCERNING LEFT-HANDEDNESS IN EPILEPTICS, WEAK-MINDED, AND NORMAL INDIVIDUALS. [Allg. Zeitschr. f. Psychiat., 1919, Vol. LXXV, p. 689.]

Of epileptics 21.9 per cent are left-handed; of weak-minded individuals, 18.7 per cent. In the families of epileptics 45.9 per cent are left-handed; in those of weak-minded individuals, 45.8 per cent; while in normal families only 27.9 per cent are left-handed. In calculating the percentage of left-handed relatives of the author's patients it was found that among the brothers 21.9 per cent were left-handed, among the

sisters 15 per cent, showing a preponderance of the male sex. In discussing the causes of left-handedness, the author states that the brain processes often play a rôle, and that in many cases the phenomena may be regarded as a sign of degeneration. Evidence of this is its frequent appearance in certain families and the fact that it is hereditary. The heredity seems to be frequently from the paternal side. There is no connection between left-handedness and the weight of the hemisphere. The author finds confirmation of Stier's view that right- and left-handedness are due entirely to functional differences. [J.]

Hauptmann, Alfred. Epilepsy in War Experiences. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXVI, p. 181.]

The author presents the conclusions arrived at from the study of fifty-two cases of epilepsy under war conditions. One of the most important facts revealed was that the exogenous moments play a very subordinate rôle in these cases. There was proof in forty-six cases, or 88 per cent, that the epilepsy was present before the war; in five further cases there was evidence of epileptic predisposition, and only in a single case could no evidences of epilepsy or epileptic diathesis previous to the war be discovered. Study of the cases to determine whether the war conditions had occasioned a quantitative or qualitative increase in the epileptic manifestations led to the view that only in a very small percentage (17.3 per cent) could exogenous factors be supposed, by the widest estimate, to have had such effect, and according to a strict estimate, in only 7.6 per cent. It was impossible to prove that any one specific injurious factor, such as exhaustion, heat, emotional crises, poisons, had a greater injurious influence than any other, but it could rather be assumed that the various injuries attacking the organism from different sides had a deleterious influence generally on the epileptically predisposed brain. With few exceptions, there seemed also to be no connection between the separate epileptic seizures and particular acute emotional reactions due to external events, as sudden fright, wounds, etc., such as are usually found at the root of psychogenic convulsions. The fact that now and then some sort of psychic excitement or physical strain was found to precede the seizure does not invalidate the rule, for these cases are very rare, and the connection between the endogenously produced emotional factor and the seizure seems rather to be coincidence and not one which warrants the assumption of an affect epilepsy, reactive epilepsy, or similar concepts. These being the conditions in regard to this disease, interest centers upon the endogenous component. The author is of the opinion that abnormality of the brain is the indispensable condition for the occurrence of epilepsy, which may be regarded as the resultant of two factors, the second of which is some adventitious irritating condition. It is questionable if any definite disturbance of metabolism can be regarded as the irritating factor, but it would seem that any

toxin formed by disturbance of metabolism may affect the abnormally irritable brain producing spasms, stupors, unconscious spells, etc., so that there could be no "war epilepsy." The peculiar condition of the brain which causes it to react with epileptical manifestations to irritations of slight intensity the author calls "disposition to epileptic reaction." The source of irritation can give no clue for the grouping of the types of epilepsy, for the irritating causes of successive seizures in the same individual may be very different. The feature which mainly permitted the differentiation between epileptic and psychogenic seizures was independence of external factors in the former type. The manner in which attacks originate is a much better criterion for making the differentiation than the separate symptoms of the attacks, though the presence of positive Babinski may be regarded as evidence of epilepsy. [J.]

Alikhan, M. Epilepsy and Inherited Anosmia. [Schweiz. Woch., 1920, No. 11.]

We have had the occasion to observe a family of thirty members in which eleven were anosmics, four hyposmics, and two epileptics.

The anosmia and hyposmia had affected this family in four generations and transferred by the feminine members (see the Scheme).

The associated anosmia and hyposmia and epilepsy suggested us to search the possible relation between these diseases. For what we examined the epileptics by Passy's method, solution of rose essence in alcohol, 1/10 $1^0/_0$ $1^0/_{00}$ $1^0/_{000}$, etc., and to control the patient's answers we use a second series of solutions of asafoetida tincture, one drop from the diluted solution of the first series in a heated glass gauge, closed with the cotton. After some seconds the patient smells the gauge with each nostril alternately, and in the case of non-perception, to begin the examination with a stronger solution. Ditto for the second series.

With this method we have examined eighteen patients of Asile de Bel-Air, and we have noted in all the patients a diminution of sense of smell, or, in the majority of cases, an absolute loss of the same sense.

From our observation and our study we think we can conclude that: (1) The anosmia is a frequent sign of epilepsy; (2) the anosmia can be inherited and affect many generations. [Author's abstract.]

Singer, Kurt. True and Pseudo-narcolepsy (Hypnolepsy). [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXVI, p. 278.]

Narcolepsy may be regarded as an expression of a nervous or psychic inferiority. The author describes two cases. In the first the sleeping attacks were said to have followed a head injury. Under mental excitement the mouth of the patient was drawn to a mask-like expression and the head sank slightly. When he laughed heartily his knees bent under him and he fell asleep. Often this occurred in dangerous situations.

There was some evidences of psychopathic tendencies in the form of effeminateness. Patient was awakened from sleeping attacks by slight noises and he remembered having fallen asleep. There were no disturbances of intelligence nor symptoms of epileptic character. The narcolepsy was probably a neurosis sui generis, originating on a degenerative foundation. The second case was not one of genuine epilepsy, but rather an hysterical sleeping fit, presenting fundamental differences from genuine epilepsy—prolonged attacks, amnesia, difficulty in awakening, drowsiness after waking, and the conditions could not be distinguished from drowsy stupor. The author is of the opinion that the name narcolepsy should be reserved for cases of the first type, which in many respects reach an epileptic equivalent, though narcolepsy seems to present a separate clinical and nosological entity. The concept does not apply to sleeping states of other character, as drowsy stupor, attacks of unconsciousness, etc. [J.]

Heilig, G. Epilepsy and Affective Psychoses After Brain Injury. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. XXXVII, p. 92.]

The author reports a case of injury of the left brain hemisphere with hemiparesis on the right side. One half year later the first epileptic attack made its appearance, and was followed by others. Nine months after the injury the first psychic disturbances made their appearance following a renewed seizure, in the form of a severe anxiety psychosis. The excitement subsided gradually, but in place of it hallucinations of hearing set in, and at this time the patient was seized with renewed epileptiform attacks. These epileptic seizures are to be regarded as a result of the brain injury, and the spasms, corresponding to the localization of the brain lesion, had none of the characteristics of the Jacksonian type. The author is of the opinion that an epileptic diathesis in the patient is evidenced by a long-standing tendency to left-handedness, and under the irritation of the cicatrix of the wound the seizures made their appearance. The affective psychoses the author also traces to the brain injury; the hallucinations of hearing being referred to pathological stimulation in the acoustic sphere (from the injury of the temporal brain). The patient had a degree of insight into the cause of these hallucinations. Disturbances of circulation arising from the brain wound may have caused the depressive anxious excitements—a condition often met with by the author in patients suffering from brain wounds. [J.]

Siebert, H. Concerning Epilepsy. [Deutsche Ztschr. f. Nervenh., Vol. LX, p. 260.]

The author states that in the great majority of cases there is no evidence of an organic or material injury of the central nervous system in epilepsy. Discussing the relation of epilepsy to trauma and syphilis, he emphasizes that although the physician in the field hospital is in a

position to determine the nature and localization of the trauma after which the epileptic attacks made their appearance, he is not always in a position to know what other contributing factors were active in the nervous systems of those who develop epileptic seizures after injuries. In the author's opinion there can be no doubt that genuine epilepsy occurs in acquired and congenital syphilis, though it is very difficult to understand how periodic paroxysms can arise from localized lesions, and how, under these circumstances, there can be intervening periods with freedom from symptoms. A case is described of a girl, twenty years of age, in whom what seemed to be genuine epilepsy developed. When the disease had continued for two years a hemiplegia made its appearance after an epileptic seizure, which receded again in a year, leaving a spastic condition of the extremities, absence of abdominal reflexes, nystagmus, atrophy of tongue on the left, amaurosis of the right eye—results which justify the diagnosis of multiple sclerosis, and this disease must be assumed to have been the cause of the epileptic attacks. As the cause of each attack an acute swelling of the brain may be assumed, producing the paroxysms by general irritation. [J.]

Marsh, Chester A. Psychological Theory of Epilepsy. [Am. Jl. Med. Sc., 1920, 149, p. 450.]

Epilepsy should be looked upon as a mental disorder. Its complex phenomena of loss of consciousness and a convulsive reaction is an abnormal muscular expression of strong mental activity. It becomes the habitual abnormal outlet for pent-up mental energy in an individual, with a definitely peculiar mental make-up, who meets unsurmountable difficulties. These difficulties may be purely mental stress or the result of some process of disease which the individual suffers. It makes little difference what the attack happens to be. The body as a living organism resents any form of infringement upon its welfare, whether it be a mental or physical attack, or both. This is more readily understood when by careful analysis we study the mental characteristics of the epileptics, comparing it to normal mental activity. Mental life is primarily teleological. Our inner faculties, that is, our instinct and ways of thinking, feeling, or desiring, come to us when things interest or excite us, and they act as the motive power which, when directed in natural channels, serves to secure our common welfare and safety. These feelings may, however, when improperly directed, find expression in an abnormal manner, and if habitually exercised in this way, may lead to the possessor's destruction. With such motive force calling for expression, one or more of the following results may be expected: Wanting to do or get something, a person may, first, be successful in every undertaking; second, unsuccessful, he may think life is then not worth while, so commit suicide; third, unsuccessful, he may escape the intolerable situation to one made more tolerable in a state of insanity, where halluci-

nations, illusions, and delusions play a make-believe part; fourth, wanting to do or get something, he may put forth every reasonable effort. As he ponders and studies, perhaps worrying a little more than he should over his troubles, seeking some new way of approach that he may be successful, he soon feels the repulsiveness of greater effort in the face of the futility of any attempt, so he ends the unpleasant experience by turning to other tasks which he can accomplish, and thus finds pleasure in their success. The instances in which the normal man gives up when demands become too trying are as many and varied as there are interests in life. The fifth and final way in which the motive power of emotional life finds expression, when the natural channel of success is blocked, is through an epileptic reaction. Possessed with a mental make-up characterized by ego-centricity, supersensitiveness, and an emotional poverty for feelings not particularly concerned in his immediate desires, the epileptic, like a man cornered in a fight, has no possibility of escape except to accomplish what he desires or succumb in his efforts. He could avoid the latter outcome if he did not possess such an exaggerated notion of his own ability and, like the normal man, could give up trying. But he has failed to acquire broad interests in life, so that when the unpleasantness of particular failures come, he cannot readily escape them. A business man finds hobbies, golfing or fishing, to take his mind from the worries of his office. In college, a student is urged to take part in athletics so as to relieve his pent-up energies. In the kindergarten the child that becomes tired, threatening the contentment of all present with some particular whim, has its attention drawn away by the mere suggestion of a new game. This is the strategy used upon each disturber so that all are kept happy as they play all morning long. A mother will not allow her child to be teased or otherwise encouraged in unpleasant feelings. Neither will she allow it to be neglected in a fit of crying, but by fondling and caressing helps it to escape its intense emotional state of unpleasantness. Children are given toys that they may be kept pleasantly occupied. These are all protective influences which tend to weaken emotions which tax our mental strength. The epileptic, however, because of lack of outside interests, cannot escape, but labors on with every obstacle serving to aggravate his emotional drive to the point of an abnormal explosion.

Fatigue is a natural consequence of any mental activity, and it demands rest which we get normally when we sleep at night. If, however, the mental work is of the nature of violent strain, such as is had in extreme emotional effort, an abnormal degree of fatigue or exhaustion is had which calls for an immediate cessation of function until a period of rest intervenes. This is what happens in the phenomena of epilepsy where the patient falls unconscious. The higher brain centers which have to do with the directing and with the consciousness of efforts become exhausted from overwork when subjected to extreme nervous

tension. This loss of consciousness is not deep enough to involve the motor centers, so the emotion goes on to an abnormal expression in muscular activity, partially or wholly unguided and uncoördinated, which we know as a convulsive seizure. [Author's abstract.]

Kühn. Hysteria as a Complication of Epilepsy in Childhood. [Neurol. Centralbl., 1919, May 1, Vol. XXXVIII, No. 9, p. 290.]

According to the view of the present day, confirmed by experiences in the war, epilepsy and hysteria can only develop on the basis of constitutional tendencies due either to a pathological arrangement or constitution of the ganglion cells or their molecules, or to a certain anaphylaxis of these elements in the brain in relation to the endocrine secretions. Epilepsy and hysteria must be due to two entirely different anomalies, for the same cause produces epilepsy in one individual while it produces hysteria in another. There are cases in which the two diseases make their appearance simultaneously, showing that there may be a two-fold pathological diathesis. Sometimes, however, the one psychosis makes its appearance after the other psychosis has existed for some time, and then the one disease seems to prepare the ground for the other. The author cites a case of this sort, that of a young girl who had suffered from epileptic seizures from early infancy. At the age of puberty, following a status epilepticus, a series of functional disturbances which are considered characteristic of hysteria made their appearance. An aunt of the patient had suffered from an organic brain disease which took the form of a hemiplegia, and in this child, beside the epilepsy and hysteria, there was a slight inclination to hemiplegia, visible in the gait and a drooping of the mouth on the same side on which the aunt was affected. [J.]

Silberstein, Adolf. Experimental Researches Concerning Traumatic Epilepsy in Guinea Pigs. [Journ. f. Psychol. u. Neurol., Vol. XXII, p. 123.]

Commenting on the hundred years of fruitless effort to connect epilepsy with a pathologico-anatomical substratum, the author states that he does not hope to discover the cause of this disease in any definite single change in the central nervous system. He undertook experiments on sixty guinea pigs. Dividing them into two groups, he produced epilepsy in one group by blows on the frontal bone; in the other he produced the status epilepticus by dividing the nervus ischiadicus. The findings in the brains of these animals after they had had epileptic attacks for some time were as follows: the ganglion cells had undergone profound changes, especially the large somatochrome ganglion cells. In numerous ganglion cells were found the granular deposits which Alzheimer designates "simple basophile matter," lending the cells a spotted appearance. The periphery of the cell bodies was divided from the

center by a more or less pronounced vacuolation. At first there were only indications of small holes, but in advanced cases vacuoles which were sometimes several times as large as the nucleus of the cell. Fine canals and clefts perforated the plasma. The Nissl bodies were irregularly arranged, lighter colored layers alternating with darker. In the initial stages they seemed to be coarsely granulated, but later were pulverized. The remains of plasmic ganglion substance of these shrunken cells were surrounded by glia nuclei nests, and besides there were cells with extraordinarily thick Nissl layers which formed a homogeneous mass corresponding to the pyknomorphic condition described by Nissl. The nuclei were usually intensively colored and excentrically situated. The deep coloring of the dendrites was remarkable; they showed vacuolization and were often so twisted that they presented the appearance of corkscrews. Neuronophagy was found everywhere, as well as ganglion cells into which one or more nuclei had penetrated. The axis-cylinders had suffered profound alterations. The medullary sheaths were partly swollen and partly granulated. The fibrous glia, both in the white and in the gray substance, had entirely disappeared in all the animals that had been struck, while in the others it was altered but had not entirely vanished. The glia cells showed proliferation. There were numerous gitter cells. The most important phenomena were the glia formations which surrounded the decaying nerve fibers. These were in the form of a thick homogeneous protoplasmic veil, and in some places consisted of a characteristic wide meshed web. Ameboid cells were abundant in the animals that had been struck. There was also thickening of the empendyma. In conclusion, the author calls attention to the fact that notwithstanding the great similarity in these changes with those found by Alzheimer and others in human epileptics, the question still remains unanswered whether the anatomical changes cause the paroxysms or the epileptic condition produces the anatomical changes. [J.]

Bornstein, Maurycy. A Peculiar Type of Splitting of the Personality. [Zeitschr. f. d. ges. Neurol. u. Psychiat.. Vol. XXXVI, p. 86.]

The author discusses briefly the modern views concerning dementia precox and describes three cases to illustrate that in schizophrenic personalities there are types which should not be forced into the dementia precox group, having only one characteristic in common with this clinical conglomerate, namely, that there is a splitting of the personality. The first case is one with pronounced schizophrenic character in Bleuler's sense, and is described for the purpose of contrasting it with the two others which represent an entirely different type of schizophrenia, a "psychic process" in Jasper's sense, which possesses the distinguishing characteristics (1) that the psychosis is a reaction to a definite experience, is in immediate connection with this experience, and that the

content of the psychosis corresponds exactly to it; (2) that the clinical phenomena deviate in several essential points from the typical schizophrenic type, there being no disturbance of association, no pronounced hallucinations, and that the insane ideas were not of persecutory character; (3) the insane ideas could be in part corrected. These types could be differentiated, not only from Bleuler's schizophrenic type, but also from Friedmann's mild paranoia. The author regards these cases as a special form of Jasper's "psychic process," characterized by their acute onset, the fact that the psychoses are reactions to external events, and the limited involvement of the mentality. He proposes the name schizothymia acuta circumscripta for cases of this specific character. From his analysis the author proposes a tentative classification of the various types at present included under the dementia precox group, as follows: Schizothymia as a designation for those forms which are manifested as a complex, split off from the total psyche and essentially connected with some real event, being for the most part a reaction to that experience. The clinical picture is a direct hypostatization of the wish contained in the complex and unfulfilled in real life. There are no disturbances of association, deep changes of the affectivity, persecutory ideas, nor hallucinations, but notwithstanding this there is permanent transformation of the character without excluding general improvement in the sense of adjustment to life. Further, he proposes to retain the classification of schizophrenia in Bleuler's sense, and finally that of dementia schizophrenica for splitting of the personality with progressive deteriorating course leading to extreme imbecility of specific character. In this way the term dementia precox, which is in reality a meaningless expression, could be dispensed with. [J.]

Porot, A. Acute Meta-infectious Encephalitic Delirium. [L'Encephale, 1920, Vol. XXV, p. 335.]

Those who have seen patients die with rabies and have observed some of the delirious cases of encephalitis during the recent epidemic could not fail to be impressed by the resemblance of the two diseases. In those cases of acute delirium in connection with infectious diseases, and where the infection is not essentially neurotropic, the author sees a metastatic action on the brain of those toxins which have already spent their force on the other organs. The author calls attention to a peculiar phase of several cases of infectious diseases observed by him, namely, a retarded appearance of the acute delirium. When all danger from the infection seemed over and the temperature had returned to normal, there was a veritable awakening of the infection in the cerebral cortex, of most serious and tumultuous character, the delirious encephalitis appearing as a complication of the primary infection, leading often to death. These conditions in no way resembled the oniric conditions without fever which sometimes follow infectious diseases on an asthenic basis, and in which

phenomena of exhaustion play an important rôle, but which are never accompanied with motor manifestations. For cases of this sort the author proposes the name acute meta-infectious encephalitic delirium. He describes four cases, two of pneumonia which ended fatally, one of pneumonia with recovery, and one of hypertoxic appendicitis with recovery after several months. [J.]

Rehm, Otto. PSYCHIC PREDISPOSITIONS AND PSYCHOSES. [Zeitschr. f. d. ges. Neurol. u. Psychiat., Vol. LII, p. 299.]

The pathological predispositions which are of importance in connection with psychoses are: 1. A predisposition which may be called impediment of thought, consisting in incoherence in the train of thought and divertibility, the pathological exaggeration of which, when combined with disturbance of emotional equilibrium, is manic-depressive insanity. 2. The second pathological predisposition is the psychogenic, that is to say, a reaction mechanism in which, on the foundation of emotional impressions, psychic disturbances arise, especially in the volitional sphere, by the falling away of certain regulative restraints either of psychic or motor nature, a condition which, if exaggerated, may lead to serious psychic disturbances in the form of hysteria. 3. A third type of anomalous predisposition is the paranoid mode of reaction, which occupies a position midway between the two first mentioned, sometimes partaking more of the character of the first than of the second, or *vice versa*. These predispositions are never acquired, but are always inherited, and follow the laws of inherited traits, there being sometimes a summation of pathological predispositions. Under certain conditions each of these three constitutional tendencies may develop into a pronounced psychosis. By combination of the psychopathic constitutions with diseases of the central nervous system, the various groups of insanities arise; there being five principal groups, according as the psychopathic tendencies are combined (first) with defects of intellectual development; (secondly) with epilepsy or neoplasms; (thirdly) with brain trauma; (fourthly) with intoxications of various origin, as inner secretory (producing schizophrenia, Basedow's disease, psychoses due to disturbances in the genital regions, etc.), parasitic or chemical intoxications; and (fifthly) with involutional changes in the central nervous system. The author believes his outline of a psychiatric system places the groupings on a basis in better conformity with biological development than does any previous classification. [J.]

N. B.—All business communications should be made to Journal of Nervous and Mental Disease, 64 West 56th St., New York.

All editorial communications should be made to Dr. Smith Ely Jelliffe, Managing Editor, 64 West 56th St., New York.

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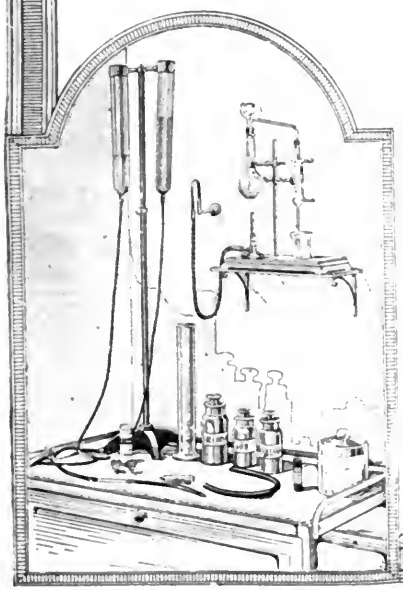

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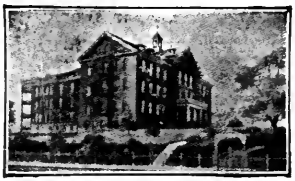

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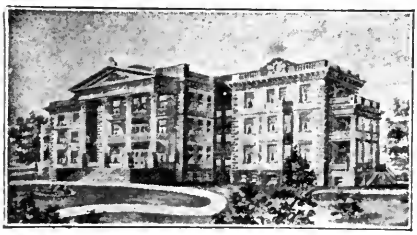

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